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**WaArusha Agro-Pastoralist Experiences with Risk of Febrile Illness: An
Ethnographic Study of Social Drivers of Zoonoses and Rural Health-Seeking
Behaviours in Monduli District, Northern Tanzania**

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Abstract

Zoonoses are a major cause of febrile illness in people living with livestock in northern Tanzania. Early diagnosis and timely treatment influence the health outcomes of febrile patients, as any delay to care-seeking is significantly associated with complications leading to severe disease. However, little is known about lay experiences with zoonoses or febrile illness in these settings, and most studies tend to focus on the epidemiology of these diseases.

In this thesis, I explore agro-pastoralist experiences of risk of febrile illness, understandings and framing of zoonotic health risks and local health-seeking behaviours. To do this, I spent ten months living amongst WaArusha agro-pastoralists in Naiti village, northern Tanzania, conducting ethnographic research using mixed-method approaches including household surveys, interviews and focus group discussions.

The study finds that herders' perceptions of zoonotic risks are shaped by external events that threaten their culture and social relationships, rather than expert narratives about zoonotic risks. Livestock and their product are central to the perceptions and management of risks among WaArusha families. Animal products particularly milk and meat-critical for household nutrition and for their therapeutic value- mediate between complex social relationships in ways that make it difficult to categorise them as "safe" or "unsafe". Familiar zoonotic diseases such as anthrax, for example, which lead to high mortality in livestock and exhibit physical symptoms that locals can identify, are more accepted risks, whereas zoonoses that do not show physical symptoms such as brucellosis, the risks of which may be real, are less readily accepted as risks to human health. However, it does not follow that people take health-enhancing decisions to minimise harm, like changing their eating habits or visiting a doctor when illness occurs. Rather, people adopt approaches which appear, from an outsider perspective, to have both rational and irrational elements, and which are influenced by issues such as trust and practicality.

Expert framings of risk and prescriptions for managing zoonotic risk, therefore, can only work when constructed alongside and in conjunction with lay beliefs. Not doing so results in parallel worlds where lay people are blamed by experts for "causing" their own sickness whilst at the same time expert authorities continue to be distrusted by local people, which in turn results in ineffective interventions.

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STATUTORY STATEMENT

This thesis has not previously been submitted to the University of Sussex, or any other University, for a degree, in this or any other form.

Signed

Violet Barasa

Dedication

For Caleb John, my soon to be born son.

Acronyms and Abbreviations

FAO	Food and Agricultural Organisation of the United Nations
FGDs	Focussed Group Discussions
WHO	UN World Health Organisation
OIE	World-Organisation for Animal Health
CDC	US Centers for Disease Control
ILRI	International Livestock Research Institute
IDS	Institute of Development Studies
LMCIs	Low- and Middle-Income Countries
mRDT	Malaria Rapid Diagnostic Test
NBS	National Bureau of Statistics of Tanzania
HSB	Health-Seeking Behaviour
HBM	Health Belief Model
SEEDZ	Social, Economic and Environmental Drivers of Zoonoses
TB	Tuberculosis
RVF	Rift Valley Fever
UN	United Nations
URT	United Republic of Tanzania
VEO	Village Executive Officer
WEO	Ward Executive Officer
ZELS	Zoonoses and Emerging Livestock Systems
ZELS-AS	Zoonoses and Emerging Livestock Systems-Associated Studentships

A Note on Names and Terminology

All interviews were conducted in Naiti village, and all respondents are anonymised, as was assured, and pseudonyms are used to preserve anonymity.

Both Maa and Swahili languages were used locally during interviews. As such, in several instances throughout this thesis, I have used local terminology, marked either as Maa or Swahili. I have retained the terms in their original usage, in brackets, whilst also giving their estimated English equivalents. These languages were used by different people; young people mostly used Swahili while older people used Maa. For clarity, I have chosen to use local words where English equivalents are estimated and where not including the local terminology would alter the meanings and/or the context in which the words were used. In particular, illness labels (in Chapter Five), and everyday terminology used to describe for example, age-sets or dwelling places and the family institution (Chapter Four), are spelled out to achieve this.

Contents

ABSTRACT	2
ACKNOWLEDGEMENTS.....	3
STATUTORY STATEMENT.....	5
DEDICATION.....	6
ACRONYMS AND ABBREVIATIONS.....	7
A NOTE ON NAMES AND TERMINOLOGY	8
CONTENTS	9
LIST OF FIGURES	11
LIST OF TABLES.....	11
1. CHAPTER ONE: INTRODUCTION.....	12
1.0 Research Problem	12
1.1 Aims and Objectives.....	18
1.2 Research Questions.....	18
1.3 Definition of Concepts: Risk, Narratives, Framings, Health Systems and Health-Seeking Behaviour.....	19
1.4 Tanzania and the National Approach to Zoonotic Control.....	21
1.5 The Study Site: Naiti Village and its Inhabitants	23
1.6 The Family Institution: <i>Olmarei and Enkang</i>	29
1.7 Thesis Outline.....	33
2. CHAPTER TWO: LITERATURE REVIEW	36
2.0 Introduction.....	36
2.1 Overview of Zoonotic Disease: Current Global Public Health Debates	37
2.2 Approaches to Zoonoses Control in Africa	39
2.3 Framings and Narratives of Zoonoses	41
2.4 Plural Interpretations of Risk.....	44
2.5 Risk and Pastoral/Agro-Pastoral Livelihoods.....	48
2.6 Health-Seeking Behaviour.....	48
2.7 Pluralist Health Systems in Africa.....	56
3. CHAPTER THREE: METHODOLOGY	59
3.0 Introduction.....	59
3.1 Epistemology	59
3.2 A Mixed-Methods and Ethnographic Approach.....	67
3.3 Demography of Research Participants.....	71
3.4 Research Methods.....	75
3.5 My Positionality in the Field: Female, Unmarried and Kenyan.....	84
3.6 Reflexivity	90
3.7 Ethics and Ethical Limitations.....	92
4. CHAPTER FOUR: LAY FRAMINGS AND NARRATIVES OF ZOONOSIS RISK IN NAITI.....	95
4.0 Introduction.....	95
4.1 The Risk Landscape in Naiti.....	95
4.2 Livestock, Livelihoods and Seasonal Variability in Naiti	96
4.3 The Place and Role of Livestock in WaArusha Livelihoods.....	104

4.4 Exploring Gendered Exposure to Livestock and to Potential Zoonotic Infections	109
4.5 Exploring Lay Interpretation and Framing of Zoonotic Risks	117
4.6 Conclusion	129
5. CHAPTER FIVE: LAY EXPERIENCES WITH FEBRILE ILLNESS IN HUMANS	132
5.0 Introduction.....	132
5.1 A Medical Perspective on Fever.....	133
5.2 Fever as Illness in Naiti	134
5.3 Lay Aetiologies/Causes of Febrile Illness in Naiti	142
5.4 Converging Narratives of Human and Animal Health	154
5.5 Conclusion	156
6. CHAPTER SIX: HEALTH-SEEKING BEHAVIOUR AND DECISION-MAKING IN NAITI.....	158
6.0 Introduction.....	158
6.1 Health-Seeking for “Social” Illness.....	160
6.2 Towards A Health Behaviour Model for Participants in Naiti	163
6.3 Characterising Approaches to Treatment of Febrile Illness in Naiti	168
6.4 Complexities and Negotiations of Health-Seeking in Naiti	174
6.5 Inter- and Intra-Household Power Dynamics	176
6.6 Anxieties Over the Quality of Available Healthcare in Naiti	182
6.7 Conclusion	185
7. CHAPTER SEVEN: CONCLUSION – MILK, MEAT AND MEDICINE	187
7.0 Introduction.....	187
7.1 Milk, Meat and Medicine as Ambiguous Substance	189
7.2 Milk, Meat and Medicine as Controlled Substances	191
7.3 Milk, Meat and Medicine as Mediators in Social Relationships	191
7.4 Theoretical Contributions to Knowledge on Zoonoses and Fever in Northern Tanzania.....	194
7.5 Towards A Holistic Approach to Zoonoses in Low-Resource Settings	197
BIBLIOGRAPHY.....	200

List of Figures

Figure 1.1: Map of East Africa Showing Tanzania and the Masai steppe	21
Figure 1.2: Study Area with Surrounding Administrative Towns.	27
Figure 1.3: Detailed Village Map Showing Distance to Basic Amenities.....	27
Figure 1.4: Entrance to Naiti Village.....	28
Figure 1.5: Typical <i>Olmarei</i> Showing Women Gathering Vegetables.....	28
Figure 3.1: The Hut where I Lived During Fieldwork in Naiti.....	69
Figure 3.2: Key Informant Interview with Female Lay Healer and Her Assistant.....	81
Figure 3.3: Sample of "Colourful" Maize used as an Analogy for Febrile Illness.....	82
Figure 3.4: Male-Only Focus Group Discussion.....	87
Figure 4.1: The Landscape in Naiti During the Dry Months in 2017.....	98
Figure 4.2: A Typical Dry-Season Cattle Camp.	100
Figure 4.3: A Carcass Lying in an Open Field in Naiti..	103
Figure 4.4: Herder Boys in Naiti.....	111
Figure 4.5: Woman Milking Cows in Naiti.	114
Figure 4.6: Communal Pond in Naiti Village.	116
Figure 6.1: Nasaya being Examined by Illness Referral Group.....	167
Figure 6.2: The Village Kiosk or “Duka”	172
Figure 6.3: The Main Decision-Maker for Household Treatment Routes.	177

List of Tables

Table 3.1: The Socio-Demographic Features of Participating Households.....	72
Table 3.2: The Schedule and Protocol for Data Collected during Fieldwork.....	79
Table 4.1: Gender- Disaggregated Weekly Animal-Human Interaction.....	110
Table 4.2: Knowledge of Zoonotic Diseases Reflecting Social Division of Labour....	120
Table 5.1: Clinical Records for 176 Febrile Patients in Naiti Health Centre.....	142
Table 5.2: Taxonomy of Emic Febrile Illness Labels.....	143

1. Chapter One: Introduction

1.0 Research Problem

There is a strong association between poverty, hunger and livestock keeping, and zoonoses (Torgerson et al., 2018; Leach et al., 2017; Cunningham et al., 2017; Grace et al., 2012; Coleman, 2002). The poverty burden endured by some of the poorest livestock-keepers across low- and middle-income countries (LMICs) is exacerbated by diminishing livestock returns and high morbidity and mortality resulting from emerging and re-emerging zoonoses (Grace et al., 2012). Livestock systems are changing in places like Tanzania, occasioned by urbanisation, demographic growth and increasing wealth associated with increasing demand for red meat (Wilson, 2015).

In pastoral and agro-pastoralist settings in East Africa, livestock systems have been undergoing changes, driven by fragmentation of rangelands through processes of excision (cutting out portions of communal land for state or private use), privatisation and commodification of rangeland resources (Lind et al., 2016; McCabe et al., 2010; Homewood, 2005; Flintan, 2008; Catley et al., 2013; Fratkin and Roth, 2005; Homewood, 1992). In northern Tanzania, conflicts over land and water resources have made it more difficult for pastoralists and agro-pastoralists to move livestock across the land, and sedentarisation has resulted in people and animals living in closer proximity than before (McCabe et al., 2010; Caudell et al., 2017; Homewood, 2005; 2008; Homewood et al., 2004). Increasingly, overlapping habitats for people, livestock and wildlife are driving zoonotic disease infections in the region (Shirima and Kunda, 2016; Halliday et al., 2015; Ladbury et al., 2017). The WaArusha in northern Tanzania, like millions of poor livestock-keepers in sub-Saharan Africa, face many threats to their livelihoods, including climate change, land-use changes and zoonotic diseases that affect both animal and human health (ILRI, 2012; WHO, 2012a; Morton, 2007).

The impacts of these changes on resource availability (land, financial, food, security) and gendered access to available resources (in terms of general scarcity and seasonal changes), and on pastoral health, both in terms of acute nutritional stress and zoonotic disease patterns, are underappreciated (Randall, 2015; Young, 2009). There is evidence that where poor pastoral people have lost access to rangelands and water resources, they have become chronically vulnerable as they lack clear alternative livelihoods

(Homewood, 2005; Lind et al., 2016; Catley et al., 2013; McCabe et al., 2010). Pasture and water are critical for livestock production, including high milk yields and healthy herds. Without these, household nutrition and overall well-being is severely affected, as lower milk yields mean reduced consumption both at home and for calf nutrients (Homewood et al., 2004; 2001; Brockington and Homewood, 1999; Fratkin et al., 1994; Lind et al., 2016; Young, 2009). Indeed, increased impoverishment, malnutrition and destitution is common among pastoralists in East Africa due to these dynamics, particularly for households with fewer herds (Lind et al., 2016; Catley et al., 2013; Fratkin and Roth, 2005). Arguably, this has huge implications on health outcomes for both people and livestock and may exacerbate vulnerability to zoonotic disease (Torgerson et al., 2018; Corbel, 2006; FAO et al., 2006; ILRI, 2012).

While the consequences of these changes on pastoral and agro-pastoralists' adaptation strategies, such as livelihood diversification and outmigration, are well-established (Hauff, 2003; McCabe et al., 2010; Lind et al., 2016; Brockington, 2011; Goldman, 2011; Fratkin and Roth, 2005; Lybbert et al., 2004; May and McCabe, 2004; Hodgson, 2000; 1999; Brockington and Homewood, 1999; Fratkin et al., 1994), the impact on people's health as a result of zoonotic disease is poorly understood (Keck and Lynteris 2018). This thesis addresses this gap by exploring how local people frame their experiences of febrile illness, and how their narratives are influenced by livestock health and zoonoses.

Local health systems in pastoralist and agro-pastoralist settings are also under-researched. Other than the studies by Leonard (2007), Leonard and Masatu (2007), Mackintosh and Tibandebage (2002), and Munga and Mæstad (2009), all of which were published over a decade ago, there is little up-to-date literature on health systems in Tanzania. These authors show that public health infrastructure in Tanzania is weak, and especially so in herder populations where traditional¹ health providers and unlicensed healers (informal, untrained or only partially trained) provide primary care for many health concerns and complaints (see also Bignante and Tecco, 2013; Chandler et al.,

¹ A distinction is made in the literature between "traditional" medical practices and beliefs and "modern" biomedicine (see Kleinman, 1988). By pastoralist health systems, I refer to what Good (1994: 23) defines as "local, indigenous or consisting of traditional healthcare practices" that have evolved within pastoral cultures, and which in rural pastoral settings provide the primary source of healthcare for people. These are constellations of beliefs, knowledge, practices, personnel, facilities and resources that together structure and pattern the way the Maasai people obtain care and treatment of febrile illness (see also Stoner, 1986).

2008). Even in formal health centres, particularly in rural areas, there are no clear guidelines on the management of health problems like febrile illness (Mackintosh and Tibandebage, 2002; Schellenberg et al., 2003; Tarimo, 2017; Seth et al., 2015). For example, in their study of febrile patients admitted to a hospital in Morogoro in Tanzania, Seth et al. (2015) found that clinicians arrived at presumptive diagnoses as they lacked appropriate tests to help them accurately diagnose febrile illness in patients after negative malaria testing. Indeed, many health centres only have a malaria rapid diagnostic test (mRDT) and lack laboratory capacity to diagnose non-malarial febrile illness (John et al., 2008; Seth et al., 2015; Tarimo, 2017; Hildenwall et al., 2016). Although official government reports indicate that malaria has decreased in Tanzania (Tanzania Ministry of Health, 2018; Tarimo, 2017; Tarimo, 2016), over-diagnosis of malaria is common. A laboratory study by Crump et al. (2013) on paediatric and adult hospital admissions in Moshi, northern Tanzania, found that of all patients who received a malaria diagnosis from the clinicians, over 60 per cent were actually suffering from a fever of zoonotic origin (including brucellosis, leptospirosis and Q-fever). Similarly, Chandler et al. (2008) found that many clinicians in Tanzania readily diagnosed febrile patients with malaria, but they did not consider zoonotic causes as they were not aware of these diseases (see also Chipwaza et al., 2014, on overdiagnoses of malaria in Tanzania).

Additionally, much of the health research in Tanzania focuses on barriers to accessing healthcare, with little focus on zoonotic diseases (see for example Sukwa, 2006; Kruk and Mbaruku, 2015; Leonard, 2007; Mubyazi et al., 2006). Thus, there is a dearth of anthropological studies on zoonoses and how these are understood locally, not only in Tanzania but across sub-Saharan Africa.

This thesis, therefore, is theoretically informed by studies that link zoonoses to livelihoods and health systems as drivers of infections. These studies argue for an examination of broader drivers of zoonotic disease in the context of poverty, structural violence, economic rights and social justice (Farmer and Sen, 2003; Catley et al., 2013; Leach and Dry, 2010; Scoones, 2010). Others such as Togerson et al. (2018) and Leach et al. (2017) are critical of over-emphasising technical solutions as “quick fixes” for the control of zoonoses, which are often advanced by dominant global public health actors such as the WHO, the OIE and the FAO. These actors, although espousing the need for

integrated approaches through concepts such as One Health² (Keck and Lynteris, 2018), in practice are influenced by dominant framings of disease risks, which result in top-down disease control strategies that exclude the narratives and realities of local, affected communities (Foster, 2012; Wilkinson, 2013). Indeed, this has led critics like Kingsley and Taylor (2016) to view One Health approaches as a “fragmented intellectual project” which is used by different actors for different outcomes. Similarly, Keck and Lynteris (2018: 5) criticise One Health approaches, arguing that:

The One Health model largely fails to take into consideration that in order for animals and humans to be united in a universal entangled health paradigm, they first need to be separated in ways that render them into ontologically distinct entities in their ethnographically specific context.

These criticisms resonate with contexts such as Tanzania, where the ministries for animal and human health have separate budgets, guidelines and protocols; consequently, when an outbreak of zoonosis occurs, response to it is likely to reflect these sectoral divisions, despite a recent policy focus on and government rhetoric around One Health (see Swai, 2017; Ladbury et al., 2017).

This thesis also problematises risk-factor approaches to studying zoonotic diseases in resource-poor settings that assume universalist understanding of what risks are; in reality, lay people’s understanding of risk differs from expert accounts as these are products of broader socio-cultural, environmental and economic realities and experiences of local people (Goodwin et al., 2012; Henwood et al., 2008; Lupton, 2002; 2013; Douglas, 1992). Therefore my intention is to explore how risk factors³ are framed by dominant actors (experts, including epidemiologists, veterinarians, clinicians) and by lay people, and how people’s daily activities, practices and belief systems often blur the lines between them and their livestock in ways that complicate official framings of risk (Henwood et al., 2008; Galaty, 2014; Woldenhanna and Zimicki, 2015; MacGregor and Waldman, 2017; Dzingirai et al., 2017).

² One Health can be defined as “a generalised and flexible term that captures the will to address the complexities and interrelations that exist between human, animal and ecological health” (Craddock and Hinchliffe, 2015: 1). Zoonoses represent one of the main motivations for a One Health approach.

³ The World Health Organization defines a risk factor as any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (WHO, 2015).

Public health actors frame risk factors as avoidable and often blame poor people's cultures in the event of outbreaks, as was the case during the Ebola outbreak in West Africa (Leach et al., 2017; Leach and Dry, 2010; Wilkinson, 2013). This very often results in top-down strategies which involve advising local people to observe good hygiene practices and food habits in order to protect themselves from disease (see for example the US Centers for Disease Control or CDC's directives on brucellosis, discussed later in this chapter). Yet in reality, as I demonstrate in Chapter Four, poor communities such as those in Naiti have no choice but to share basic resources such as water and homes with their livestock, and implementing these recommendations is a challenge.

Additionally, risk-factor approaches also assume a shared understanding of the concept of "risk", but as elaborated on by many anthropologists, risk is not unproblematic and means different things to different people (Lupton, 1999; 2013; Goodwin et al., 2012; Beck, 1999; 2006; Douglas, 1992). Risk is dynamic and plural and is understood from one's social and cultural context. For example, as Chapter Four demonstrates, complex human-animal interactions in Naiti influence what people perceive to be "risky" practices and what they do not. In order to understand these complexities, I used ethnographic research methods which offered me proximate experiences to the communities and people that I focussed on (on ethnography, see Gubrium and Holstein, 2012; Boellstorff, 2007). This is because quantitative research methods, involving one-off or periodic short visits to communities, may fail to capture the nuances of daily life, but when combined with in-depth qualitative inquiry, can inform a broader analysis of contextual factors that drive ill health in people and their livestock (see Gubrium and Holstein, 2012; Boellstorff, 2007). As Denzin and Lincoln (2000) caution, methodologies that do not put people's experiences at the core of research end up with only one side to the story, with power relations always present within that story. Power relations refer to the unequal distribution of domination and relationality, involving superiority and inferiority in how people relate to each other, for example the researcher and the researched (see Foucault, 1977; Denzin and Lincon, 2000; Argawal, 1995; Ritchie, 2003; Rubin and Rubin, 2005; Seidman, 2006, among others on power relations).

Consequently, this research applies ethnography and mixed-methods approaches (described in detail in Chapter Three), which involved spending a long period of time living in the community and observing everyday life as it unfolded. This enabled me to make visible the numerous inter-linked issues, including the gender- and age-related

aspects of human-animal interaction, the social-spatial-temporal patterns of interaction, lay aetiologies of febrile illness (both in animals and humans), household negotiations, and resource allocation, and how these affected people's experiences of illness, their understandings and interpretation of risk, and their health-seeking behaviours.

Finally, on the basis of the above theoretical insights, and the ethnographic evidence that demonstrates the complexity surrounding social drivers of zoonoses and highlights culturally-specific aetiologies of fever, I question the assumptions inherent in the framing of risk factors for endemic zoonoses in medically-underserved, resource-poor, rural, uncertain and mutable contexts like Naiti.

This research focuses on lay experiences of febrile illness and on how people living in rural communities, where access to animal and human health services is poor, cope with illness in the context of increased threats from zoonotic infection. It examines how human-animal interactions shape these experiences and how this impacts health outcomes for people and their livestock. To study and explore these issues, I spent ten months living and conducting research in Naiti, an agro-pastoralist village in Monduli district, northern Tanzania. While in Naiti, I used ethnographic and other mixed social science methods to collect data.

This study finds that in Naiti, local people's behaviours and practices which influence understandings of health and illness are not rooted solely in the individual, as may be assumed by biomedical approaches. Rather, health and illness are experienced as dynamic, collective and interactive processes occurring between lay people and local health systems and play out in ways that are complex and that go beyond a single episode of illness or an individual patient.

Drawing on ten months of ethnographic fieldwork conducted between 2016 and 2017, this thesis examines the lives and livelihoods of herders during a time of dynamic social, economic and environmental shifts which are driving zoonotic disease events in this and other rural Tanzanian settings (Cleaveland et al., 2017; Ladbury et al., 2017). I describe how men and women (and sometimes children) navigate everyday life experiences of risk, where livestock are important both as sources of food, medicine and, sometimes, illness. I interrogate local perceptions and framings of livestock illness in relation to herders' health, and how febrile episodes are responded to within the plural local health systems. This knowledge contributes lessons and reflections for future research and for

broader public health intervention strategies for controlling endemic zoonoses in these and similar settings in Africa.

This chapter proceeds as follows. Section 1.1 outlines the aim and objectives of this study. Section 1.2 outlines the research questions posed by the study. Section 1.3 briefly describes the analytical concepts employed. Section 1.4 provides a brief introduction to Tanzania and the national approach to zoonotic disease control. Section 1.5 is an introduction to the study site and its inhabitants. Section 1.6 gives an overview of family institutions in the study site and, lastly, Section 1.7 provides an outline of the rest of this thesis.

1.1 Aims and Objectives

The aim of this thesis is to explore communities' understandings of and coping mechanisms for febrile illness and zoonoses, using the case of the WaArusha livestock-keeping communities in Naiti in Monduli district in northern Tanzania. The main objectives are as follows:

- To explore the risk of febrile illness from animal products and gendered human-animal interaction in Naiti, Tanzania.
- To identify narratives and framings of febrile illness in Naiti, Tanzania.
- To characterise the nature of the local health systems and health-seeking behaviour of local people in Naiti, Tanzania.

1.2 Research Questions

This thesis set out to answer the following three questions:

1. How do men and women in Naiti perceive risk in relation to consuming animal food and interacting with animals?
2. How do local people in Naiti today explain and experience febrile illness?
3. How do people decide what to do in cases of febrile illness and what methods of treatment are available?

1.3 Definition of Concepts: Risk, Narratives and Framings, Health Systems and Health-Seeking Behaviour

Risk

Throughout this thesis, I adopt the concept of risk as a plural, dynamic and fluid term that represents different meanings with regards to threats, hazards or danger to people's health. I draw from sociological theories of risk such as "risk society" (Giddens, 1990; Beck, 1992; 1999) and "risk environment" (Goodwin et al., 2012) to demonstrate the dynamics and context-specific complexities that render the concept problematic, while at the same time using these theories to help understand the multiplicity, variability and incongruity in the meanings of risk (Henwood et al., 2008; Lupton, 1999; 2013). I apply all this to my research in Naiti. As Henwood et al. (2008) caution, rather than define the research situation from the outset in terms that involve a presumed universal notion of "risk", my intention was to remain reflexive and open to the emic interpretations and framings of risk in Naiti, because doing otherwise,

itself acts as a framing device for the research encounter, indicating what the researcher will be 'looking for' from the participant, what is 'relevant' and implicitly, or perhaps explicitly, what is not. (Henwood et al., 2008: 5)

Narratives and Framings

I use narratives as story lines with a beginning, a middle and an ending. In the context of zoonotic disease outbreaks, I adopt Wald's (2008: 2) approach, who describes narratives as those which begin "with the identification of an emerging infection, includes discussion of the global networks throughout which it travels, and chronicles the epidemiological work that ends with its containment". Also adopting Leach and Dry's (2010) analyses of epidemic narratives, I interrogate official narratives of zoonoses that define response pathways such as those by the CDC and their influence on African governments, including Tanzania's response to zoonoses. In adopting the language of narratives, I show evidence from Naiti that challenges storylines presenting local people affected by zoonoses as lacking knowledge about these diseases, when in reality people often have no choice but to cope with multiple risks with limited resources.

Like narratives, framing is about articulating a phenomenon. Framing entails the role and use of language, rhetorical argument and stories in interpreting a given issue or debate (Koon et al., 2016). As Leach et al. (2010a) also argue, framings involve the diverse ways in which issues and their dynamics are interpreted and presented. Framings affect how

zoonoses are studied and what methodologies are prioritised. For example, Keck and Lynteris (2018: 2) observe that because zoonoses were framed early on as an ecological problem arising from natural focality, this implied that epidemiological methodologies were widely seen as superior, as epidemiology “emphasises distinct phases of pathogen transmission and the thresholds between them”. Yet many anthropological studies have also revealed a wide range of social, economic, environmental and ecological drivers of zoonoses which can only be understood by applying diverse qualitative and quantitative methodologies drawn from a wide range of disciplines from the social sciences, humanities and biological sciences (see Keck and Lynteris, 2018; Bardosh et al., 2017; Grace et al., 2017; Dzingirai et al., 2017; Cripps, 2000).

Health systems

Health-seeking occurs with the cooperation of and in conjunction with local health systems. Bloom et al. (2008) define a health system as a sum total of all organised responses to illness and disease. Kleinman (1981; 1988) had earlier considered health systems as constituting a specific cultural system. However, the exact configuration of health systems varies from country to country and from one context to the other within a given country or region (WHO, 2019b). Because of these variations, I apply the concept of health-seeking behaviour loosely as a tool to explore the range of options that are available, and which are utilised by patients in Naiti. In doing this, I aim to characterise the health systems and how they influence lay health-seeking behaviours.

Health-seeking behaviour

Health-seeking behaviours refer to the decisions and actions of patients and their families in pursuing acceptable levels of health and well-being (Clewley et al., 2018; Poortaghi et al., 2015; Wade and Halligan, 2004). As I demonstrate in Chapter Six, in Naiti, these behaviours and actions entail cooperation and complex negotiations between patients and the local health systems. I adopt this concept to help me understand and characterise the approaches that people employ in monitoring their bodies, distinguishing symptoms and interpreting them in order to look for remedies to regain optimal health.

Having introduced the analytical concepts guiding this thesis, I now introduce Tanzania and the study sites.

1.4 Tanzania and the National Approach to Zoonotic Disease Control

The United Republic of Tanzania is the largest country in East Africa, covering 940,000 square kilometres, 60,000 of which are inland water (Macro, 2011). Tanzania lies south of the equator and shares borders with eight countries: Kenya and Uganda to the north, Rwanda, Burundi, the Democratic Republic of Congo and Zambia to the west, and Malawi and Mozambique to the south (see Figure 1.1).

Figure 1.1: Map of East Africa Showing Tanzania and the Masai steppe. Source: Nnko et al. (2017).



The population of Tanzania as per the last national census of 2012 was 44,928,923 (URT, 2012). This population is sparsely distributed, with a population density of 51 persons per square kilometre to about 32 persons per square kilometre in the pastoralist and agro-pastoralist settings occupying the Maasai Steppe (see Figure 1.1). In Naiti village, the population was estimated to be about 3,000 in 2012, although there are no recent figures available. Nearly 70 per cent of the population in Tanzania live in rural areas and are dependent on smallholder agriculture and livestock production for their livelihoods (NBS, 2012).

Healthcare coverage in Tanzania, like in many LMICs, is limited due to a lack of resources available to support health systems (Leonard, 2007; Macro, 2011). Mbugi et al.

(2012) highlight that major limiting factors for both human and veterinary health coverage in Tanzania include the extremely limited resource base and a shortage of qualified personnel, which have resulted in a huge burden of disease. These authors estimate that at least 60 per cent of the population in Tanzania do not have access to formal healthcare services and rely on traditional and alternative care systems to meet their day-to-day health needs (see also Munga and Maestad, 2009; Marsland, 2007; Seth et al., 2015; Tarimo, 2016). For example, at the time of this study, there was only one basic health dispensary in Naiti, the study village, which was established in 2014. The clinic was staffed with one clinical officer who was responsible for a population of about 3,000 people spread across a vast area, with poor infrastructure making it difficult for many to access the dispensary. The clinic was operating under severe constraints as it lacked medicines, diagnostic equipment, electricity and water. For most of their health problems, and as I explain further in Chapter Six, Naiti residents rely on a range of formal and informal providers who fill the gap of unmet demand in healthcare. These include traditional healers and drug peddlers, who flourish but are not well regulated by the government.

A national health survey found that Tanzania's poor health coverage has resulted in the growth and prevalence of communicable and non-communicable diseases as well as emerging and re-emerging diseases, including zoonoses (Macro, 2011). Zoonoses are a problem in Tanzania, especially in pastoralist and agro-pastoralist areas, where many people live in close proximity to livestock (Grace, 2012; Galaty, 2014; Jones et al., 2011; Galvin et al., 2004). This is also exacerbated by a rapid increase in both human and domestic animal populations and variations in vector ecology (Little, 2013; Galvin et al., 2004). Official figures on the burden of zoonoses in Tanzania are scant (Cripps, 2000), but some studies in northern Tanzania indicate that about 7.7 per cent of people are infected by zoonotic disease (Crump et al., 2013). However, these figures may be conservative, as many endemic zoonotic infections such as brucellosis are not part of the routine public health advisory packages or within information given to livestock-keepers (Swai, 2017; Mbugi et al., 2012). This lack of attention to otherwise preventable diseases has consequently resulted in their under-reporting and an associated lack of appropriate treatment for patients who may be exposed to zoonotic pathogens, particularly livestock-keepers (Mbugi et al., 2012).

A study conducted by Bashaka (2015) and previously by Swai et al. (2010) on the knowledge and attitudes towards zoonoses in both animal health workers and livestock-keepers proposed the need for public health promotion and education using an interdisciplinary One-Health collaboration between veterinarians, public health practitioners and policy makers. The Tanzanian government has taken steps in this direction and, in 2017, a One Health Coordination Desk was established to co-ordinate zoonotic disease response in Tanzania. Nonetheless, budgetary constraints remain a challenge in achieving lower prevalence for most endemic zoonoses in the country (Swai, 2017). Some of the endemic zoonoses that are within the remit of the One Health Coordination Desk in Tanzania include rabies, brucellosis, anthrax, Rift Valley fever (and other haemorrhagic fevers), zoonotic influenza, anthrax, human African trypanosomiasis and brucellosis (Swai, 2017). However, Mbugi et al. (2012) observed that, collaboration between multiple stakeholders (veterinarians, clinicians, wildlife conservationists, community members etc.), which is necessary to operationalise One Health in many sub-Saharan African countries remains poor because the approach is not straightforward. It requires consensus-building and community education, both of which cost money, but there are no funds for its facilitation. In addition, and as I show in chapters Four, Five and Six, because animals are deeply interwoven with the social system in livestock-keeping communities like the WaArusha, this can make it difficult to enforce interventions that may be perceived as threatening to the social fabric of these populations. Therefore, there is a need for research into local understandings of zoonoses and what this means for national zoonotic control strategies in settings such as Naiti. In what follows, I introduce the study area, Naiti, and give a historical overview of its inhabitants, before discussing my research approaches.

1.5 The Study Site: Naiti Village and its Inhabitants

Naiti village lies within the Maasai Steppe (Nnko et al., 2017). It is an area of vast savannah plains located along the Arusha-Manyara road in Makuyuni ward, Monduli district, northern Tanzania (see Figure 3.1). Its inhabitants can be best described as agro-pastoralists, that is, in addition to livestock production, they are also involved in crop cultivation (Caudell et al., 2017; Little, 2013; Niamir-Fuller, 1990). Most people here

own small plots of land where they grow food crops and raise their livestock and are not wholly transhumant.⁴

The vast majority (95 per cent) of the population are the WaArusha or “the people of Arusha”, signifying their original settlements around the Arusha and Meru regions in northern Tanzania (Caudell et al., 2017). There were also a few participants (5 per cent) in this study who identified as ethnic Maasai.⁵ The WaArusha are a mixed people of Nilotic origin who share many cultural features with the Maasai (Little, 1998; Swift, 1988; Spear and Waller, 1993). Like the Maasai, WaArusha speak the Maa language, observe Maasai circumcision rituals, consult *laibons* or spiritual mediums, and are inducted into Maasai age-sets⁶ (Spear, 1997; Spear and Nurse, 1992). They also respect their elders’ power and authority, or *enkanyit*, meaning respect (Allegretti, 2017; Goldman, 2011; Holtzman, 2001). They have been described as likely descendants of either the Loogolala or Parakuyo Maasai sections, who were displaced by Kisongo Maasai in the early nineteenth century (Caudell et al., 2017; Spear and Nurse, 1992).

Muir (1994) describes the WaArusha as one of the migrant communities from the Arusha highlands who were attracted to farmland in the sparsely-populated plains of Monduli district, a Maasai heartland where Naiti village is located. Others such as Spear (1997) observe that access to mountain streams that provided fresh water rather than surface pools with likely contaminated water, along with small livestock herds, meant that WaArusha were less vulnerable to disease than their Maasai counterparts, and that these advantages influenced WaArusha expansion into Maasai habitats, displacing the latter and settling in the plains around Arusha city and surrounding areas, including in Naiti (Caudell et al., 2017: 11).

In interviews, older key informants revealed that WaArusha settlement in the Maasai Steppe accelerated in the 1960s through to subsequent decades leading up to 2000. However, WaArusha communities leaving Arusha town and the Mount Meru region is not just linked to livelihood diversification and cultural connection to the Maasai. It is

⁴ The residents practice some form of transhumance; they usually split their herd, leaving the “milk” herd permanently at the homestead, and sending the rest on short transhumance.

⁵ Another Nilotic group and the largest pastoralist group in Tanzania and Kenya. The Maasai share habitats and cultural practices as well as language with the Arusha.

⁶ A cohort of male peers within a certain range of ages, who travel together through a series of culturally-conditioned life stages (Grandin, 1991).

also linked to the Nyerere government's unpopular villagisation programme in the 1960s (Ndagala, 1982; Shao, 1986). During this period, many Tanzanians were resettled into rural villages across the country under the slogan of "brotherhood" or *ujamaa* (in Swahili) (ibid.). These settlement patterns may have contributed to increased sedentarisation, as more people meant less land was available for transhumant pastoralism (Greco, 2016).

However, although there is extensive literature on the livelihoods, institutions, social relations and culture of the Maasai and other pastoralist and agro-pastoralist groups in East Africa, including but not limited to the Samburu, the Borana and the Turkana (Galaty, 1993; Hodgson, 1999; 2000; 2001; Homewood and Brockington, 1999; Homewood, 2005; 2008; McCabe, 2003), few studies focus on the WaArusha agro-pastoralists. Despite cultural similarities and habitat overlaps between the WaArusha and the Maasai (Caudell et al., 2017), some features of WaArusha people remain distinctive. These include diet (primarily of vegetables, beans, grains and fish, poultry alongside animal products), diversified livelihoods that combine livestock keeping with crop cultivation and trade (Caudell et al., 2017; Spear, 1997; Spear and Nurse, 1992), and settlement and migration history (most are immigrants to Monduli district). Indeed, while older respondents insisted on a common cultural identity with the Maasai, younger cohorts of the population perceived themselves as a distinct group from the Maasai. During interviews, they talked about "original/pure Maasai" versus "newcomer Maasai", and they identified with the latter description.

However, the WaArusha's history with pastoralism and their connection to the Maasai is more complicated than this, and in fact the shared cultural values have solidified the WaArusha standing as a Maa-speaking group that is separate yet connected to the Maasai (Allegretti, 2017; Goldman, 2011; Holtzman, 2001).

Naiti village, like other villages in agro-pastoral areas of rural Tanzania, does not fall easily into a conventional concept of a small-sized rural settlement with defined homesteads and roads. On the contrary, like its vast neighbouring Maasai-inhabited pastoralist villages, Naiti is a conglomerate of four remote sub-villages. In Tanzania, the lowest administrative unit is a village (*kitongoji* in Swahili). Each village is headed by a Village Executive Officer or VEO. If a village is too large and too spread-out for a single administrator, as is the case for Naiti village, then it can have several sub-villages (see Greco, 2016). The VEO is a government-appointed and paid representative. Sub-village

chairpersons (in charge of sub-villages, and answerable to the VEO) are not on the government payroll and are elected by the people on a rotational basis.⁷ These ad hoc officials sometimes attract relative power and get perks during government functions in the village, where they may get paid for organising functions in conjunction with the VEO. Each sub-village chairperson appoints ten cell leaders, in charge of every ten households to assist with local administration. This system of rural administration became widespread during the villagisation policies in Tanzania (Shao, 1986).

Each of the four sub-villages in Naiti comprises approximately 100 households with an average household size of ten people (NBS, 2012). Vast distances separate families and neighbourhoods, although most people seemed to know everyone in the village due to meeting at a communally-shared water point and at grazing grounds. There is one health dispensary in the village and a small kiosk where families obtain medicines and domestic items. Many people also walk to the nearest market in Makuyuni, a roadside market located about 20 km from Naiti (see figures 3.1 and 3.2). Most people from the village walk to and from Makuyuni, a trip that takes them about four hours overall. You can also take a public minibus which charges about 20 US cents⁸ or approximately 500 Tanzanian shillings (one way) for the journey. Arusha and Kisongo are bigger towns that are much further from the village, approximately 120 km and 60 km, respectively (see Figure 3.1). The cost of transport to Arusha costs, on average, four US dollars for a one-way trip. This is a lot of money by local living standards, and therefore only a few of the wealthier families go as far as Arusha to trade or visit a hospital and return home on the same day. Sometimes, people walk to Kisongo to trade in livestock as the livestock market there is bigger than in Makuyuni. These trips take entire days but are preferred because these markets offer better prices. People also prefer to trade sick livestock at markets that are further away from home, as they are unlikely to sell a sick animal to a neighbour or a relation or indeed at a local market such as Makuyuni.

⁷ They often represent particular political party interests and may be involved in campaigns and civic education and receive some remuneration for this.

⁸ At the time of this study, 1 US dollar exchanged for 2,200 Tanzanian shillings.

Figure 1.2: Study Area (Enclosed in Red Square) with Surrounding Administrative Towns.

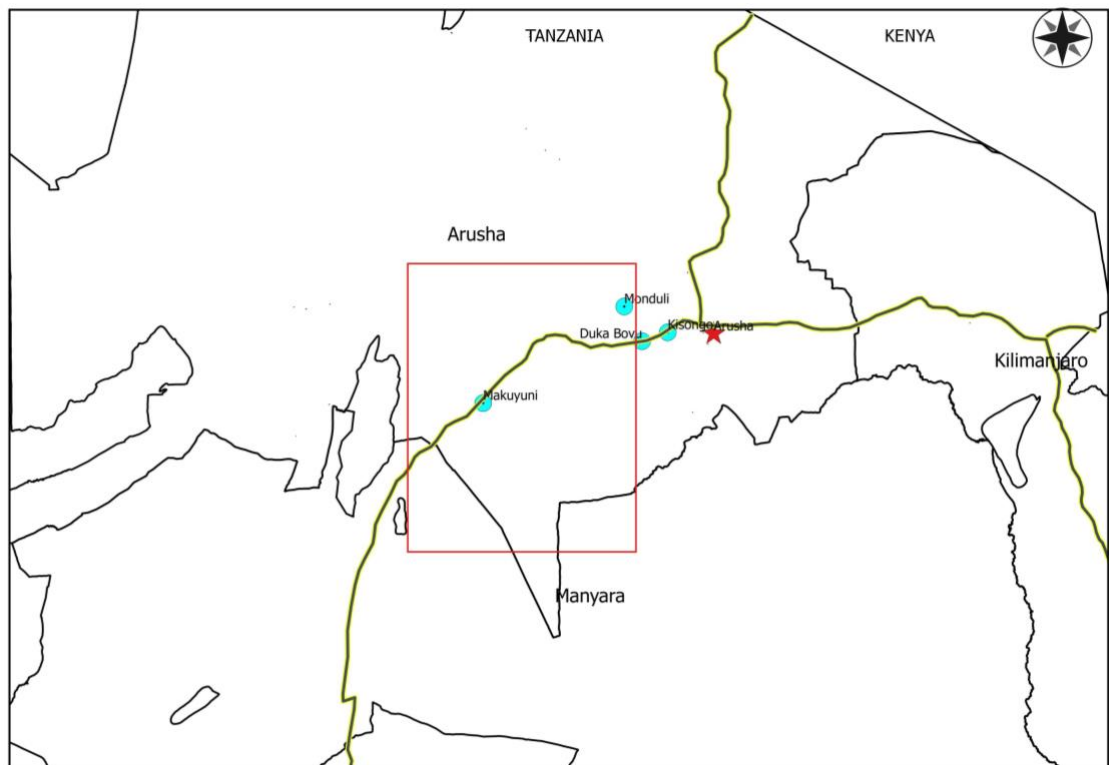


Figure 1.3: Detailed Village Map Showing Distance to Basic Amenities.

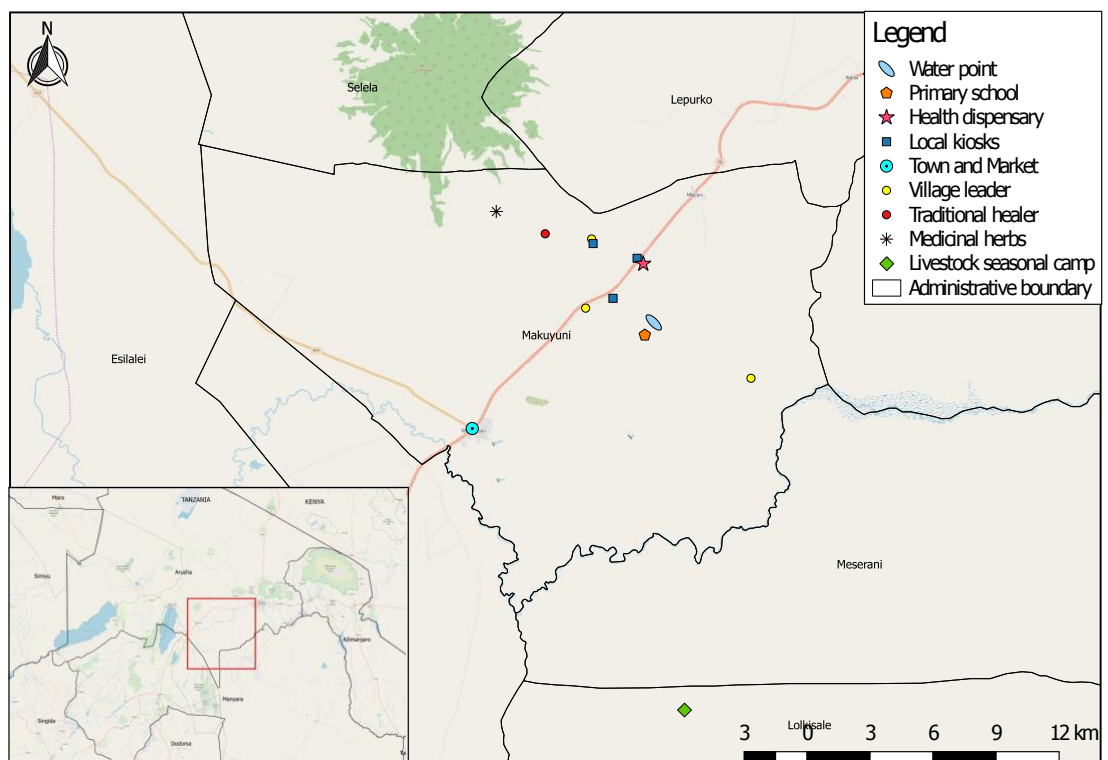


Figure 1.4: Entrance to Naiti Village.



Figure 1.5: A Typical Household (olmarei) Showing Women and Girls Gathering Vegetables from the Garden.



1.6 The Family Institution: *Olmarei* and *Enkang*

This research adopted the household as the basic unit of data collection and analysis. The term “household” is loosely used here to represent the emic term *olmarei* (Maa), which represent a social rather than a spatial unit that is typically headed by a man. If the man is polygamous, then the *olmarei* comprises several sub-households or *ajis* (Maa) that represent each of the man’s wives’ and their children’s huts (see Figure 1.5 above), with the polygamous husband occupying a separate hut⁹ within his *olmarei*. This was largely the case among participants in Naiti. On rare occasions (among two per cent of participating households), an *olmarei* was headed by a widowed or divorced older woman, as I will explain below, and who shared her hut with her grandchildren, with the latter helping to take care of her and whatever livestock she has.

However, a household among Maa-speaking communities or indeed in many African settings is not as straightforward or easily defined. Anthropologists have historically been critical of economists approaches to the concept of “household”. For example, Guyer (1981) and Guyer and Peters (1987) dismissed the notion of a household as being a bounded and largely impermeable unit, because, as these authors found in their studies across Africa, households are not fixed units but are constantly evolving. They are not discretely bounded groups, rather, different household members draw from a variety of networks and relationships to access resources (see also Randall and Coast, 2015). Additionally, as I discovered in Naiti, households are also differentiated along the lines of gender and generation in ways that are complex and which do not easily fit the conventional western definition of “household”. As Randall and Coast (2015) also observed in their study in Tanzania and Burkina Faso, without studying and understanding the nuances within and between “households”, researchers, particularly those employing quantitative methods such as surveys and census, may fail to capture the intra-and-extra-household social networks that characterise access to and control of resources in these complex family units. Indeed, understanding these dynamics has implications for data analysis and reporting, particularly where studies involve measuring household poverty and its determinants, as I will show later in Chapter Three.

⁹ The polygamous husband maintains a private hut within the homestead where he sleeps and invites each of his wives to spend a night with him in privacy. This is also where he entertains his guests and hosts his male friends.

In Naiti for example, a household can also constitute what is commonly referred to as *enkang* (Maa), which typically involves three to four related households (of brothers and/or stock friends and their families) that belong together to form a bigger compound or *boma* (Swahili), where resources may be pooled and shared in a “circular cluster of dwellings enclosed by a fence” (Homewood and Rodgers, 1991: 37). *Enkang* is perhaps what Randall and Coast (2015) conceptualised as an “open” household where flexibility, movement and extra-household networks are mobilised to cope with limited resources, as opposed to a “closed” household which encompass a notion of a bounded, compact family unit.

However, within an *enkang* in Naiti, polygamous households usually comprise sub-households or *ajis*, as earlier described, where each wife and her dependents live. In this case, the polygamous husband would have a separate hut where his meals are served (by his wives), and where he sleeps and entertains important family visitors, who are usually male. Consequently, the distinction between an *enkang* and *olmarei* is not always clear, and it took me quite a while (the first three months of fieldwork) to study and understand these nuances and dynamics.

Furthermore, within *enkang*, the socio-economic status of individual *olmareis* and/or *ajis* can be quite different (see Gitungwa, 2018; Knueppel et al., 2010; White, 1980, on wealth differentials). This is because a polygamous husband does not always distribute his wealth, mainly land and livestock, to all his wives equally, because he marries them at different times and, depending on how much land he owns and his herd size, his wealth holdings vary across time. Secondly, female-headed households such as those belonging to widows, separated or divorced older women, do not usually own land, because land is owned only by men¹⁰ (see FAO, 2018 and IFAD, 2009, on gender and land ownership in similar settings), and these women do not own nearly as many (if any) livestock as households headed by men. Third, junior warriors or young men (*korianga*¹¹ Maa) who

¹⁰ Suffice it to mention, access to land in Tanzania is complicated, with private ownership still emerging from the past condition of all land being owned by the state (see Shao 1986 on the history of land and state ownership in Tanzania)

¹¹ Young men typically of marriageable-age (late 20s to mid-30s) and who are about to graduate to become young elders. Men in Maa-speaking communities belong to age cohorts who go through life stages together, beginning from circumcision and up to marriage. Each age-set (or cohort) graduates into leadership depending on their stage of life, and this guides many social affairs such as wealth, social status and cultural identity.

have recently married would not usually have been allocated parcels of land by their fathers or accumulated large enough herds to be considered wealthy.

These categories are important insofar as they help in understanding the variation and diversity in responses to illness within households and in understanding patterns of human-animal interaction across various households. For instance, in households with small children not old enough to herd, both husbands and wives herded the family livestock. Although in these cases, grazing took place closer to the homestead to allow for other activities such as farming to be conducted concurrently during grazing hours. I examine these patterns of human-animal interaction further in Chapter Four to show how they impact the ways in which different members of a household may be exposed to livestock and how they understand risks of illness.

Therefore, within the context of my research, I found it helpful to use the *olmarei* (I use this interchangeably with *family* and/or *household* rather than *enkang*) as a unit of analysis, as this represents the closest equivalent to a “household” in the western usage of the term. *Olmarei* is also the official unit for household registers at the village administrative offices in Naiti. The usage of both terms throughout this thesis will henceforth represent a unit comprising a husband, his wife or wives and their children or dependants, except in the case of female-headed households or families, in which case I will clarify the difference. This is because as I observed, it is within the *olmarei* where resources are allocated and decisions about their use are made.

A typical *olmarei* in Naiti includes a man, his wife or wives, and their dependants. Each wife manages her own house or *aji*, where she lives with her children, within her husband’s household. An *aji* can be a single-roomed hut with a cooking place in the corner of the hut, where meals are prepared and served, and a sleeping area where the wife sleeps with her children. Some *ajis* have a separate hut which serves as a kitchen, and where teenage daughters (in preparation for marriage) also sleep. Cooking areas (either a separate hut or a space within the main sleeping hut) are also shared with calves and small ruminants, particularly sick calves, sheep and goats, which are cared for by women and girls at night.

Adult sons’ own livestock, initially given to them by their fathers, and then accumulated over time to form a herd that sons can use to form their own *olmarei* after marriage (see also Galaty, 2014; Homewood and Rodgers, 1991, on livestock distribution among the

Maasai). Writing about the neighbouring Maasai culture, Ndagala (1992) estimates that a boy is allotted three cows between birth and puberty, and by the time the young man reaches the *ilmorak* age (a stage where he is marriage-ready, typically after a protracted period between circumcision and graduation into a young elder),¹² he will have enough of a herd to start his own family. I found this also to be common among the WaArusha.

When a man dies, as I observed in the village, his wife or wives are inherited by the man's brother or son (of the senior co-wife) and the new husband is in charge of the *olmarei* and the livestock left behind by the dead man. If a woman divorces her husband, or has no children, or only has daughters and her parents allow her, she will return to her family where she will be given a place to build a home and raise a herd (this was also observed among the Maasai by Galaty et al., 2014; Talle, 1988).

However, this was not always the case, as I met some widowed women who had gone against these inheritance arrangements, perhaps showing new forms of agency and independence or changing gender norms. To give an example, a young woman in her twenties whose husband had died recently told me she “refused” to be inherited by her husband's brothers because she wanted to choose a partner herself. She was still living in her deceased husband's household with her two young sons, and her family survived on cultivating food crops from a small parcel of land and raising three goats. This of course did not sit well with the rest of the people in her family, who perceived her behaviour as “odd”,¹³ and she admitted that her situation made her “lose friends and family and lack a support system”.¹⁴ For example, her brothers-in-law had taken over part of the land that her family owned, leaving her with only a small portion to cultivate. In one instance, she had been severely ill, but no one came to check on her or help feed her children, as was socially expected. This shows that although some elements of culture are changing in WaArusha communities, there is resistance to these changes by the majority of the people.

¹² There is typically no specific age for this as it is a condition of initiation and cultural training that culminates in a big graduation ceremony where young men become community elders. A group of male peers, known as an age-set, but who typically vary in actual age by as much as ten years (between the oldest to the youngest peer), go through life stages together and are “allowed” to marry during the same period.

¹³ The woman's mother-in-law described her this way to me.

¹⁴ Interview, Naiti, 30 February 2017.

1.7 Thesis Outline

The thesis proceeds as follows:

Chapter Two consists of the literature review, which explores further the analytical concepts (introduced above) that are used to provide a framework for data analyses. Specifically, the literature examines global public health framing of risk factors for zoonotic disease and contrasts these framings with broader sociological perspectives of health risks, and which consider diverse perspectives on risk. I examine these debates in order to establish knowledge gaps, building on critiques of biomedical disease-based models, which are challenged by the fact that zoonoses are not always visible nor easily managed with the identification and addressing of the risk factors. I explore these approaches using the five analytical concepts explained above: risk, framings, narratives, health systems and health-seeking behaviour, in order to build a conceptual framework that emphasises lay people's own experiences, with which I analyse the research findings from this study.

Chapter Three describes the methods and methodology that I used to carry out the study. It begins by laying out the epistemological standpoint from which the methodological approaches are drawn. The principal methodology used is ethnography together with mixed methods. This is also informed by principles of grounded theory, where epistemologies emerge from the research rather than pre-conceived opinions of the author. These approaches were necessitated by a desire to explore complex issues by means of methodological diversity. Survey techniques provided the sampling framework within which participants were identified for in-depth, qualitative research. The chapter ends with a discussion of my own positionality and ethics, and a reflection on the research process.

Chapter Four examines livelihoods, livestock and lay framings of risk. It begins by explores the broader risk landscape in Naiti more generally and examines daily life in the village in the context of complex risks. In particular, it discusses local livelihoods that are based on agriculture and livestock production and explores how seasonality impacts on these, producing many risks to people's livelihoods. It also examines the diverse functions of livestock in WaArusha culture and human-animal interaction (when, where, how, whose, which animal species), including details of the type, intensity and duration of such contact across the spectrum of social differentiation, in order to build a profile of

differential susceptibilities and potential exposure to sick animals (and contaminated animal products). This chapter further explores gendered experiences and lay framings of risk, drawing upon examples from a wide range of herders to show emic diversity in risk perceptions, in order to understand how risk perceptions, play out in people's everyday life situations, and to illuminate how people live with risk. The conclusion revisits the argument about risk being plural, gendered, and situated within people's livelihoods, practices and belief systems, and the need to broaden approaches to studying zoonotic risks.

Chapter Five explores the numerous and interconnected ways in which people interpret febrile illness symptoms in both people and livestock. I draw from the data to unveil the complex network of actors and factors that are involved in constructing lay aetiologies of febrile illness in Naiti. Senior male elders and mothers-in-law form an important part of therapy management groups, and their accrued wisdom is mobilised to reach an agreed diagnosis in the event of severe illness. Locally, illness, in the form of fever, is thought of in a number of different ways. It can be a normal and a regular occurrence that people need not worry about, or it can be a symptom of more serious illness that needs treatment, a spell cast by a jealous neighbour or a social sanction for dishonouring ancestors and god, or perhaps it is unusual, and an expert is required to help people understand (and treat) it. I show that, whereas clinicians may approach treatment based on a specific disease, lay people in Naiti conceptualise febrile illness in ways that are complex and that carry plural meanings. These meanings, which draw on indigenous concepts, are co-constructed from and with biomedical terminology, and this chapter therefore argues for broader ways of approaching zoonoses. It advocates involving local people themselves in constructing knowledge about illnesses and their aetiologies, so as to design zoonotic disease control strategies that are culturally appropriate and reflective of the lived realities of agro-pastoralists.

Chapter Six builds on Chapter Five to explore people's responses to episodes of febrile illness and how healthcare-seeking is approached. I highlight the nature and range of healthcare options (both formal and informal) that are available to Naiti residents, before analysing the ways in which people engage with them by exploring local health-seeking behaviour within pluralist health systems in Naiti. I show that, people's behaviours and actions in pursuit of health and well-being are not linear and are made complex by collective approaches to health-seeking that go beyond an individual patient or a single

illness episode. I argue that, whereas health systems literature may emphasise conventional barriers to health-seeking, such as affordability of healthcare costs, poor infrastructure and poor healthcare quality, in Naiti, these categories are just some among more powerful determinants of health-seeking, such as inter- and intra-household power dynamics that dictate and define what is a barrier and what is not. I demonstrate that the mere availability and accessibility of health facilities does not mean those who can afford them will choose to use these facilities; rather, families choose those options that are trusted and practicable even when they are not necessarily the most effective treatments. I argue for a consideration of these dynamics, and their incorporation into research on and interventions in lay health-seeking behaviour.

Chapter Seven concludes the thesis by revisiting my research questions and how the study has answered them. I revisit the role of milk, meat and medicine in local epistemologies of risk and the implication of the findings for further research on zoonoses control strategies in low-resource settings. Animals and their products, as with medicine and how it is used, have become subjects of many global public health debates; they evoke images of unsafe foods and drug-resistance in many people. However, there are many competing and ambiguous ways in which these products also symbolise what is good for healthy people, as well as being culprits in the contraction of diseases. Milk, meat and medicine are thus both enablers and inhibitors of good health and must therefore be carefully understood in order to fully appreciate the complexities of zoonoses causality in pastoralist and agro-pastoralist settings such as Naiti. I argue, therefore, that there are no simple causes of zoonoses, or indeed simple solutions to controlling zoonoses, especially in communities where people, livestock, livelihoods and the environment are intertwined in ways that create harmony and a “oneness” of social cohesion. These complex interactions challenge what experts might characterise as “risky events”, which are quite often part of everyday life, which produces risks that people have to constantly manage, with few resources.

2. Chapter Two: Literature Review

2.0 Introduction

This chapter reviews the framings and narratives of risk in the epidemiological and sociological literature. It also explores the literature on health systems and lay health-seeking behaviour within the context of current global public health debates on zoonotic diseases that affect people in sub-Saharan Africa.

The chapter begins with an overview of these debates and a critical examination of narratives that influence the response to epidemics in areas that are resource-poor. Section 2.2 examines approaches to zoonoses and control in Africa, while Section 2.3 examines framings and narratives of zoonoses. Section 2.4 explores how risks from zoonoses are conceptualised and framed in sociological and epidemiological literature, and how animals are vital to the framings of zoonoses. I explore the divergences in lay versus expert understandings of risk, drawing from the work of Kosoy and Kosoy (2018), Keck and Lynteris (2018), Lupton (2013), Henwood et al. (2008), Frankenberg (1993), Beck (1992; 1999; 2006), Rhodes et al. (1999), and Goodwin et al. (2012), among others, to highlight how risk is situated in the specific contexts and experiences of people's daily lives. Section 2.5 explores the place of risk in pastoral/agro-pastoralist livelihoods systems to put into context how risks are produced and the local risk-management strategies. Section 2.6 examines health-seeking behaviour literature more broadly, drawing from the work of Clewley et al. (2018), Schneider (2017), Musinguzi et al. (2018); Atwine et al. (2015) and Mebratie et al. (2014), while Section 2.7 specifically examines plural health systems in Africa, by exploring how healthcare is organised and accessed. The section concludes by examining the distribution of healthcare services in Tanzania, and in pastoralist and agro-pastoralist settings in particular, drawing from the works of Gwatkin et al. (2000), Tibandebage and Mackintosh (2005), Leonard (2007), Munga and Maesta (2009), Schellenberg et al. (2003) and others, in order to help in understanding how healthcare inequalities impact lay health-seeking behaviours and early detection of disease, including zoonoses in places like Naiti.

2.1 Overview of Zoonotic Disease: Current Global Public Health Debates

Current global health policy is dominated by debates on “emerging” or “re-emerging”,¹⁵ infectious diseases that pose new challenges for animal and human health everywhere (Keck and Lyteris, 2018; Kosoy and Kosoy, 2018; Zinsstag et al., 2011; WHO 2019a; WHO, FAO and OIE, 2004; WHO, 2016; Paige et al., 2015). In sub-Saharan Africa, where millions of rural livelihoods are dependent on pastoralism and/or smallholder livestock-keeping (Grace et al., 2017; Shaw et al., 2014; ILRI, 2012; Covarrubias et al., 2012), zoonotic diseases impact livestock production, leading to economic losses both in terms of livestock mortalities, and reduced milk and meat yields, which all impact household nutritional status, with poor health outcomes for those affected (Grace et al., 2017; Shaw et al., 2014; Catley et al., 2013;).

In northern Tanzania, zoonotic-associated febrile illness is common in herder populations such as the Maasai and WaArusha communities (Shirima and Kunda, 2016; Halliday et al., 2015; Crump et al., 2013). This has been attributed both to habitat overlaps for people, domestic herds and wildlife (Tarimo, 2016; Seth et al., 2015; Halliday et al., 2015; Crump et al., 2013). In addition, a number of studies have highlighted the prevalence of many zoonotic infections which are endemic in pastoralist and agro-pastoralist settings in northern Tanzania, including brucellosis (Shirima and Kunda, 2016; Halliday et al., 2015; Kunda et al., 2007), anthrax (Hampson et al., 2011; Swai et al., 2010), Rift Valley fever (Chengula et al., 2013), bovine tuberculosis (Shirima et al., 2003) and rabies (Cleaveland et al., 2002). These diseases affect people’s health and productivity, with significant implications for livelihoods (Cleaveland et al., 2017; Mangesho et al., 2017; Grace et al., 2017).

Some scholars are wary of the approaches adopted by key international health actors, including the delivery of health technologies and disease surveillance as an effective response to emerging or re-emerging zoonoses. They caution that there is no “magic bullet” to curb zoonotic outbreaks, and that an overemphasis on reducing individual risk factors ignores how health risks are also shaped by social, economic, political and cultural factors (Keck and Linteris, 2018; Cleaveland et al., 2017; Leach et al., 2017; Cunningham

¹⁵ “Emerging” diseases are those that have not occurred in humans before, or that have occurred only in small numbers in isolated places, while “re-emerging” diseases refer to those that were once a major problem globally or in a specific country, that then declined drastically but are again becoming significant problems to a large proportion of the population (WHO, 2004).

et al., 2017; Woldehanna and Zimicki, 2015). Instead, some like Cunningham et al. (2017) and Kosoy and Kosoy (2018) have called for the adoption of holistic approaches such as One Health to respond to zoonoses, because the intersections of human, animal and ecosystem health at the centre of these infections are often underappreciated.

The delivery of health technologies (diagnostic equipment, drugs, pesticides and surveillance infrastructure) that target specific diseases is important but insufficient in addressing the threat of zoonoses, particularly in resource-limited settings and in regard to tackling the dynamic drivers of infectious disease (Keck and Lynteris, 2018; MacGregor and Waldman, 2017; Dzingirai et al., 2017; Leach et al., 2017; Cleaveland et al., 2017). Social determinants of health intersect with drivers of disease (social, economic, environmental, political and cultural) to have particular impacts for certain categories of people (MacGregor and Waldman, 2017; Dzingirai et al., 2017). For instance, studies have shown that poverty is closely linked to zoonotic risks as poor people tend to live in areas with limited access to both human and veterinary healthcare (Bardosh et al., 2017; Grace et al., 2017; ILRI, 2012). Furthermore, human illness caused by animal disease is also linked to deteriorating human health, keeping poor households in a vicious cycle of poverty (WHO, 2016; Randolph et al., 2007; Covarrubias et al., 2012; WHO, FAO and OIE, 2004).

However, dominant framings of disease that define global responses to epidemics often do not fully consider these intersections (Dzingirai et al., 2017; MacGregor and Waldman, 2017; Leach et al., 2017; Leach and Scoones, 2013). Local knowledge and perception of illness impacts upon early detection of zoonoses and response (Mangesho et al., 2017; Elsinga et al., 2015), however studies on local knowledge of zoonoses and especially on febrile illness in livestock-keeping populations such as in Tanzania are scarce. Therefore, this thesis focuses on understanding lay framings and narratives of zoonoses among WaArusha agro-pastoralists in Naiti village and interrogates how framings of zoonotic risks influence experiences with febrile illness and local health-seeking behaviours.

2.2 Approaches to Zoonoses Control in Africa

Zoonoses outbreaks in Africa have and continue to have serious impacts on human health. Despite their identification and prevalence, targeted interventions remain poorly coordinated and ineffective because of a significant lack of financial resources as well as a lack of local healthcare provision (Grace et al., 2017; Mbugi et al., 2012; WHO, 2010; 2012b; 2013; Grace et al., 2012).

In Kenya, Rift Valley fever (RVF), affecting sheep, was first reported in 1931; since then there have been periodic outbreaks reported not just in Kenya but in many other parts of North Africa and sub-Saharan Africa, including Somalia and Tanzania (WHO, 2010; ILRI, 2012b). RVF outbreaks are, to an extent, a consequence of climatic change affecting vector distribution and numbers, which could be predicted by climate-based modelling (Catley et al., 2014; Grace et al., 2012). However, these outbreaks could also be due to lack of integration of both animal and human health complexities (Keck and Lynteris, 2018).

Preventative measures, such as vaccinations in anticipation of these predicted outbreaks, would be an effective way to reduce their impact and hence risk of human infection (WHO, 2010). However, effective action to limit the prevalence of RVF in Africa requires integrated approaches as well as political commitment, and awareness of the problem among poor people themselves.

In Tanzania, particularly in rural contexts such as in Naiti, RVF is also one of the most pressing diseases. However, as in Kenya, control interventions remain uncoordinated (Swai, 2017). The priority for tackling this and other endemic zoonoses such as leptospirosis, Q-fever and brucellosis is on strengthening technical capabilities over organisational capacities such as communication, trust building and political will, which are all needed to tackle zoonotic diseases (Swai, 2017; Cleaveland et al., 2017; Mbugi et al., 2012).

Another serious endemic zoonosis affecting many parts of sub-Saharan Africa, including Tanzania, is rabies, impacting both rural and urban poor, particularly children. In these regions, the main intervention for zoonoses control has largely been focussed on vaccinating dogs, and particularly in Tanzania, these interventions are driven by concern for the collapse of the Serengeti wild dog population. This has in some places led to confirming local suspicions that wildlife are considered more important than people and

other livestock, in disease management as in other arena (for example Mpolya et al., 2017; Cleaveland et al., 2007 on mass vaccination of wild dogs in the Serengeti ecosystem). However, management of the disease is hampered by poor integration of both human and animal health actors, and a lack of financial resources resulting in ineffective health programmes for those infected, as well as no programmes to undertake mass dog vaccinations (see Zinsstag et al., 2011, on effectiveness of mass dog vaccinations).

The significant point here is that zoonotic disease control and management in low-resource settings can benefit from integrated approaches that harness local people's knowledge and indigenous disease surveillance systems, since these people live with, and devise ways of coping with, health challenges (Keck and Lyrentis, 2018; Cleaveland et al., 2017). Yet, so far, approaches to zoonoses have mainly focussed on abstract understandings of risk or probability for emergence or re-emergence of disease, and ways to mitigate risk factors in affected populations. There is often an assumed universality of risk factors without due regard to the contextual drivers of disease risks, and the plural interpretation and lay understandings of risks, particularly for zoonotic infections (Keck and Lynteris, 2018; Goodwin et al., 2012; Schneider, 2017). In what follows, I discuss some of these dominant framings and narratives of zoonoses risk.

2.3 Framings and Narratives of Zoonoses

Zoonoses as a disease category traces its origin from models of disease ecology that focussed on the pathogen cycle in the work of Karl Meyer in the 1930s and '40s (Honigsbaum, 2015) and the work of Carl Schwabe (1984). As Keck and Lynteris (2018) argue, ontologies and epistemologies and their biopolitical regimes influenced zoonoses being framed as located within natural foci, which could only be understood using epidemiological methodologies. However, as Quammen (2012) argues, interest in zoonoses is no longer just a preserve of epidemiologists and other natural scientists; rather, there is significant interest in the subject from the social sciences, notably from economists, anthropologists and sociologists. Keck and Lynteris (2018) argue that a crucial factor driving this interest has been the idea that novel pathogens are now capable of causing pandemics beyond the confines of their local foci, with the example of pandemic influenza seen as the gold standard for global pandemic threats (Caduff, 2015). Keck and Lynteris (2018: 3) conclude that:

This pandemic fantasy has in recent decades become the platform of massive scientific, political, and economic investment... it has also reconfigured animals as agents of humanity's future return to 'the stone age'. Envisioned as the sources not simply of human extinction but also of civilisation collapse (for those who survive), animals are hence rendered into agents of the reanimalisation of humankind, or, in other discourses, as wreaking revenge against humans for the wrongs of domestication.

Framings of zoonotic risks to humans have however continued to reflect the dominant ecological paradigms that pay little attention to other ways of understanding disease contagion. By *framings*, I refer to what Leach et al. (2010b) identify as the diverse ways in which issues and their dynamics can be interpreted. Thus, framings are "the many ways in which system boundaries, dynamics, functions and outcomes are open to multiple, particular, contextual, positioned and subjective assumptions, methods, forms of interpretation, values and goals" (Leach et al., 2010b: 371). For instance, the way that zoonoses have been framed using biomedical paradigms such as disease ecology makes use of dominant forms of knowledge that are often different from lay people's indigenous knowledge (Keck and Lynteris, 2018; Lynteris, 2017; Henwood et al., 2008), yet this lay knowledge also influences responses to disease outbreaks. This is particularly true when framings evolve into a normative view. As Wilkinson (2013) argues, when this happens, framings become much more than just interpretations; they become the official criterion for action, and anything that falls outside the dominant framing is marginalised. For example, Leach and Dry (2010) argue that the framing of epidemics is often interpreted as resulting from specific risk factors which include local people failing to adhere to particular, prescribed behaviours and practices. Such framings may obscure the real causes of disease outbreaks, which can also be a consequence of long-term stresses and changes, as discussed above. This of course further marginalises poor people, whose local traditions and cultures are often blamed when epidemics occur (see for example Wilkinson, 2013, on Ebola in West Africa).

For example, the US Centers for Disease Control (CDC) frames brucellosis susceptibility in people as a result of human behaviour and practices. It frames prevention in the following way:

The best way to prevent brucellosis infection is to be sure you do not consume undercooked meat, unpasteurized dairy products, including: milk, cheese, ice

cream. If you are not sure that the dairy product is pasteurized, do not eat it. (Centers for Disease Control, website)

The CDC further warns:

People who handle animal tissues (such as hunters and animal herdsman) should protect themselves by using: rubber gloves, goggles, gowns or aprons. This will help ensure that bacteria from potentially infected animals do not get into eyes or inside a cut or abrasion on the skin. (Centers for Disease Control, website)

Although the CDC's message is geared towards a North American population, it has international remit and actively supports zoonotic control interventions in countries such as Tanzania, and such framings may drive and inform their work in these countries. For instance, although brucellosis is one of Tanzania's six priority zoonotic diseases (Swai, 2017), there are no clear national guidelines for its prevention in people, and the CDC leads the development of strategies for brucellosis control in the country. One of these strategies is:

Build laboratory capacity and strengthen surveillance for brucellosis in humans since it is not currently a reportable disease. (One Health Zoonotic Disease Prioritization for Multisectoral Engagement in Tanzania, in Swai, 2017: 14)

But in Naiti, livestock and their products (meat, milk, blood) are used both as food and as medicine to treat febrile illnesses, which potentially have zoonotic origins. Additionally, livestock and their owners share habitats, including, in some cases, sleeping quarters, particularly when caring for sick small stock and calves. In the daytime, during herding hours, livestock from neighbouring villages converge around shared water points where women also collect water for domestic use. On one occasion, I witnessed a cow calving at the water point; a few young boys assisted with the birthing process and were exposed to the cow's birth fluids. Not surprisingly, they had no gloves for protection and they did not consider this a risk to their health, even though contact with animal birthing material is one of the risk factors associated with transmission of brucellosis in humans in these settings (Shirima and Kunda, 2016; Shirima et al., 2003; Halliday et al., 2015). I asked one of the boys about wearing gloves to protect himself from getting into contact with animal fluids, and his response was:

I do not have gloves. Where do you get them from? I just use bare hands to help animals give birth all the time, then I rub dry earth on my hands which dries the fluids off and that's it. The government does not give any protection to us so even if we know there are risks, we just have to deal with the problems in the only way we know how.¹⁶

As this example shows, there is a lack of consideration of the broader drivers of brucellosis infections in resource-poor contexts in both the CDC's and the Tanzania government's strategies for brucellosis control. Indeed, in Tanzania, brucellosis in humans is currently not a reportable disease, meaning there is no established national mechanism for reporting the disease in humans and there is no national data on the extent of the disease in humans (Swai, 2017). Consequently, technical approaches such as improving disease surveillance and diagnostic capabilities, without considering integration of multiple actors and factors that drive disease outbreaks, reflect framings that are top-down, and which may lead to narrowly formulated health-promoting activities that are removed from the daily conditions of poverty that many herder populations in places like Naiti inhabit. Without access to basic services such as electricity and sanitation or personal protective equipment such as gloves, it will take more than building laboratory capacity and strengthening surveillance to control brucellosis in humans in Tanzania.

Narratives, on the other hand, utilise dominant framings to make a coherent story that easily appeals to the masses. Roe (1994) and Wald (2008) argue that narratives are particularly dangerous because they can justify actions by particular people, institutions, networks or communities who wield power over those whose knowledge and own stories are silenced. Powerful narratives often become embedded in institutional and political processes (Leach et al., 2010b; Wilkinson, 2013), and they define response pathways or channels that marginalise groups and individuals who may have alternative views or framings (Leach and Dry, 2010). Narratives that present local people affected by zoonoses as lacking knowledge about zoonotic diseases and engaging in "risky" practices that predispose them to infections are misleading because they do not show the bigger picture of how and why infections occur.

As detailed in later chapters, residents in Naiti utilise a sophisticated cultural disease surveillance system that helps them predict, identify and prevent animal and human

¹⁶ Interview, Naiti, 9 June 2017.

illness. This includes seasonal migration to “safer” camps (described in Chapter Four; see also Caudell et al., 2017) so that domestic livestock do not overlap with wildebeest in grazing fields, as the latter were believed to carry risks of zoonoses, namely malignant catarrhal fever (MCF; see Lankester et al., 2015a; 2015b; 2016).

2.4 Plural Interpretations of Risk

Several considerations of zoonotic disease have highlighted the importance of interdisciplinary approaches to studying health risks (Keck and Lynteris, 2018; Goodwin et al., 2012; Wood et al., 2012; Henwood et al., 2008). These approaches identify a range of relevant risks including migration, land planning and use, economic, social and psychological factors, social interactions, the natural environment, and interactions between animals, humans and pathogens. Keck and Lynteris (2018: 4) argue for collaborating across disciplines and “working together – in ways congruent and unsettling, complementary and antagonistic – [with] different models of animal-human infection”. These authors note that human-animal relations are complex and require approaches that accommodate diverse views and perceptions in order to understand how and where risks are generated and developed, and to inform the design of effective ways of addressing these risks.

Anthropologists tend to frame zoonotic disease risks as situated in the cultural contexts in which health and illness are constructed, while biomedical approaches tend to see risk as removed from the social, economic, political and cultural contexts of affected populations (Foster, 2012). Frankenberg (1993) argues that biomedical approaches often do not give due consideration to community priorities, preferences and concerns about their health and that of their livestock. These involve questions such as: which risk factors should be emphasised for which individuals or groups (health providers, educators, young mothers), and at which social level (individual, household, communal)? Henwood et al. (2008) note the considerable significance that anthropologists attach to participants’ perspectives, orientations and contextual understandings of risk. Indeed, without combining or at least acknowledging the different drivers of zoonotic disease and considering the central role that lay framings play in disease control, it can be inefficient and even difficult to intervene and implement measures that reduce risk (Foster, 2012). And as Henwood et al. (2008: 5) assert, “consideration of risk framing is not only theoretically important but a key, reflexive resource for risk researchers”.

Zoonoses, as Keck and Lynteris (2018) have argued, are an event that modern societies have to prepare for alongside multitudes of other hazards and threats. Sociologists such as Beck (1992; 1999; 2006) have coined the concept of “risk society”, arguing that modern society is riddled with risks which individuals and groups must prepare for or be prepared to deal with in everyday life. Through an analysis of macro-social processes and their relationship to concepts of risk, Beck’s thesis posits that “modernisation risks”, resulting from the interactions between complex technological systems and global environments, have become part and parcel of everyday life. At the level of the individual, Beck (1992: 63) proposes that risk brings fundamentally different distribution logics into play, with respect to class and strata positions, and that modern society, or the risk society, “is concerned not with the production and distribution of ‘goods’ but with the production and distribution of ‘bads’”. Yet, as I show in Chapter Four, and as Henwood et al. (2008: 4) also argue, “what is perceived as risk and how that risk is perceived will vary according to the context in which, and from which, it is regarded”.

Similarly, as Foster (2012) suggests, knowledge rests on social factors and not on an independent reality, and risks are multifaceted and plural, and can only be understood through plural world views (see also Dzingirai et al., 2017; Beinart and Brown, 2013). Foster (2012) describes risk as a natural, social and narrated phenomenon, and claims that these different approaches produce different understandings of risk that carry specific socio-cultural and political meanings. For example, discussing a Sino-centric localisation of avian flu, Keck and Lynteris (2018: 5) observe that what public health experts framed as a hotspot for a massive flu emergence was perceived by local poultry farmers as “an ordinary duck disease that fits in economic anticipations”.

Henwood et al. (2008) call on those studying risk to consider its plural meanings. Specifically, risk researchers are advised to inculcate “a degree of self-reflexivity... so that they are aware of their own framings and remain sensitive to the possibilities and consequences of imposing them on research participants” (Henwood et al., 2008: 5).

This is also explicit in Keck and Lynteris’s (2018) argument that local people’s knowledge of their livestock and risks must be taken seriously when these animals are affected by zoonoses, because they are embedded in broader spectrums of agencies and causalities, and caution ought to be taken not to disrupt the interconnection and “oneness” that some societies have with non-human species (see also Kohn, 2013). This assessment

seems true to the WaArusha in Naiti, who do not perceive livestock as separate entities but as part of family units that include humans, animals, ancestors and the environment (including forests, farmland and air).

Foster (2012: 12) was therefore right in arguing that “a realist epistemology is shown to produce reductive, universalistic forms of risk that do not predict, explain, or represent fully the plurality of risk in the world”. Indeed, reductive scientific framings of risk, constructed mainly by veterinarians and public health experts, become dominant and overshadow other forms of knowledge regarding health risks, in particular those of indigenous populations (Agarwal, 1995; Antweiler, 1998; Beinart and Brown, 2013; Leach et al., 2010a).

Finally, Goodwin et al. (2012) propose the term *risk environment* (see also Rhodes et al., 1999) to describe a combination of economic, cultural and psychological factors that contribute to disease risks. The risk environment goes beyond Beck’s (1992; 1999; 2006) macro-level drivers of disease transmission such as rapid population growth, land policy, land use changes and national epidemic response mechanisms. It encapsulates micro-level factors, including local ecological systems and pathogen interaction, and local peoples’ own perceptions of animals’ multifaceted functions and how these affect their assessment of risk. This dovetails with Caudell et al.’s (2017) findings that herders in Tanzania carefully considered the economic costs and benefits associated with disease risk in relation to herd composition and made choices that were economically viable and pragmatic for individual households. These included, for example, vaccinating cattle but not small stock because healthy cattle carried a higher social and economic value compared to small ruminants. Similarly, Douglas (1992) found that, in general, different societies feared different threats, which correlated with differences in social and economic structures. She argues that these structures generate attitudes towards certain risks. In other words, people view risks within the framework of their realities and life-worlds, which may lead to common fears (about certain risks and not others), and social organisations will emphasise the risks that hold the categories together (see also McCabe, 2010). Additionally, and as I illustrate in Chapter Four, individuals within society also experience risk differently as a result of their specific roles and livelihoods. Therefore, the argument is not to say that societies or groups are homogeneous, but that the understanding and experiences with risk are plural, dynamic and complex, and that these complexities need to be explored.

Consequently, the concept of risk presents a lens through which zoonoses in Naiti can be understood, because it is social, cultural and symbolic (Keck and Lynteris, 2018; Henwood et al., 2008; Douglas, 1992), as well as biological and defined (Kosoy and Kosoy, 2017; Frankenberg, 1993). At the same time, risks are macro and universal, such as the risks posed by modernity that Beck (1992; 1999; 2006) describes. In other words, individual perceptions of and responses to situations encountered in everyday life are also permeated by wider sociocultural discourses (Henwood et al., 2008). Such discourses are constitutive of everyday meanings and hence, in turn, affect the way any situation can be perceived or “framed” (ibid.).

Epidemiologists quantify risk factors for zoonoses as a way of making health interventions more effective, and often this is required to optimise the use of resources, particularly in low-resource settings (Kosoy and Kosoy, 2017; Frankenberg, 1993). However, risk factors should not solely be framed as a localised probability for harm based upon specific pathogen transmission routes, and practices that facilitate these transmissions (Keck and Lynteris, 2018). They are also multidimensional and fluid, the product of historical events and social forces (Lupton, 2013; Foster, 2012; Goodwin et al., 2012; Lock and Nguyen, 2010), and social constructions of risk (Beinart and Brown, 2013; Douglas, 1992). Rosenberg (2002) adds to this, arguing that risk can also acquire moral and cultural “textures”. Therefore, risks are both experienced at a societal, collective level (i.e. pastoralists), and in an intersectional way (i.e. women and girls from poor households are more at risk of trypanosomiasis due to their foraging in forests, where they come into contact with disease vectors, as a case in Zimbabwe demonstrated; see Dzingirai et al., 2017). Indeed, as I demonstrate below, and as later chapters also show, these constructions are influenced by people’s everyday interactions with livestock, with different consequences, such as who falls ill, and how or where treatment is sought. Importantly, and following the suggestions of Henwood et al. (2008), by drawing attention to the ways in which the multiplicities of risk framing and their possible incongruities are negotiated by participants, I demonstrate how adopting a reflexive attitude both during data collection and in the analysis and presentation of findings can allow for these diverse framings to emerge. In the next section, I locate some of these debates specifically in studies of risk in African pastoral and agro-pastoralist settings.

2.5 Risk and Pastoral/Agro-Pastoral Livelihoods

Pastoral and agro-pastoralist livelihoods, movements and routines are changing, whilst weak public health infrastructure and the prevalence of zoonotic diseases are having increasing implications for the health of people and animals (Grace et al., 2017). Animal-human interactions occur daily, often overlapping with wildlife in shared habitats, with implications for transmission of zoonoses (Galaty, 2014; Kohn, 2013). Klous et al. (2016) and Zinsstag et al. (2011) have shown that contact with animals can lead to transmission of micro-organisms by inhalation, ingestion and direct contact, or during incidents such as biting or other injuries inflicted by animals. In Naiti, for example, livestock are used as both food and medicine, and access to human and veterinary health services is limited, as is the case in similar settings in Tanzania (Little, 2013; Leonard and Masatu, 2007; Mackintosh and Tibandebage, 2002). Consequently, biomedical risk-factor approaches to zoonoses must be accompanied by an understanding of other social, economic, environmental and cultural drivers of disease, including how livestock-keepers themselves understand and manage disease risks (Keck and Lynteris, 2018).

As has been argued, the ways in which lay people frame their everyday experience of living with risk and uncertainty is dependent upon the kinds of livelihoods that they have (Alaszewski and Coxon, 2008). And as I show in Chapter Four, although specific “risky” events or behaviours can, to some extent, be managed through promoting better awareness of zoonoses amongst agro-pastoralist populations, in Naiti, people’s everyday way of life presents threats to health in ways that are complex and that challenge simple narratives of behaviour change (see Schneider, 2017). I show that herders are aware of the risks to their own and their animals’ health, and this awareness is explicit in participants’ accounts of everyday life, and in ways they respond to a given health problem.

Some studies have engaged with emic interpretation and experiences of risk among African herders, categorising populations as either “risk-aware” or “lacking risk awareness” (Mangesho et al., 2017; Shirima et al., 2016; Ng’ang’a et al., 2016). Studies that integrate multidisciplinary methodologies in studying zoonoses in rural African settings, including those by Dzingirai et al. (2017), Cleaveland et al. (2017) and Leach et al. (2017), as well as the present study, show, however, that risk awareness is more complex than these binaries assume, and that the intersections of social difference, social

roles, daily activity patterns, seasonality, and patterns of exposure due to migration and settlement impact on which populations are at risk of transmission and which are not (Vanderwaal et al., 2017). For example, in their study of human trypanosomiasis in Zimbabwe, Dzingirai et al. (2017) found that poor women and migrants who had no village land, and who often foraged for food in dense forests, were more exposed to tsetse flies and wildlife that inhabited the forests, and which were also responsible for the transmission of human trypanosomiasis. These authors also found that in Kenya, Rift Valley fever mostly affected pastoralist groups, and in particular young male herders who frequently came into close proximity with mosquito breeding sites, which are hosts for the disease.

Among Maasai pastoralists in East Africa, McCabe (1997) found two overlapping lay perceptions of risk. The first was with regards to seasonal and ecological variation. Here, herders anticipated risks where these variations led to livestock losses. The second was about anticipating what might happen after livestock losses, for example when herds fall below a certain minimum threshold due to external factors. This degree of anticipation led to social organisation to avert or at least prevent livestock losses. And because the ecological dynamics of extensive livestock systems in East Africa mean that herders live in risky environments (Goodwin et al., 2012; McCabe, 1997), many herders may accept that risks are inevitable, and therefore organise themselves to manage and cope with them.

As I show in Chapter Four, there are also trade-offs that poorer herders must make between certain risks, weighing their options in times of stress, and uncertainties that produce environmental, economic and welfare risks (McCabe, 1997). For example, Ladbury et al. (2017) found that in the Ngorongoro Conservation Area of Tanzania, which is inhabited by Maasai herders, poor households frequently consumed carcasses even when they were aware of the risk of zoonoses because they otherwise faced a high likelihood of starvation. In such cases, a choice had to be made between “a small chance of falling sick and facing prolonged periods of starvation” (Ladbury et al., 2017: 8). Similarly, in Naiti during the unusually long dry season in 2016–2017, poorer households that faced food insecurity consumed animal carcasses that died during the drought, even where they suspected that illness may have been the cause of mortality in those animals. It was also particularly common for small ruminants showing signs of ill health to be slaughtered and eaten by the owners, partly because of lack of food, but also because of the belief that their illness was not a health risk to people. Yet this is the opposite of

epidemiological evidence that suggests that small stock can transmit harmful zoonoses, such as brucellosis, to people (Shirima and Kunda, 2016; Corbel, 1997).

Consequently, in addition to the range of biological, socio-cultural, geographical, spatial, environmental and other factors, some like Woldehanna and Zimicki (2014: 4) have argued for an expanded model of studying zoonotic risk factors, to incorporate “proximate determinants of human-animal interaction” and exposure to zoonotic infections in herder settings. These include specific human activities at the household level, and how, where and when people interact with animals. These authors show that social roles and the division of labour (who is involved in what livestock activities, norms and behaviours) shape the type and intensity of interaction between people and animals. This argument is corroborated by the present study, as illustrated in Chapter Four.

Factors of social differentiation influence how individuals and groups are exposed to risks of infection and in what ways (Dzingirai et al., 2017). In addition, ecological interaction, including contact with wildlife and/or contaminated grass or water, may potentially expose domestic livestock to zoonoses (Kosoy and Kosoy, 2018; Lankester et al., 2015a; 2015b; Gardner, 2012; Butt and Tuner, 2012), and, in turn, herders can be exposed during subsequent contact with these animals. Furthermore, Caudell et al. (2017) found that among agro-pastoralists in Tanzania, variations in herd composition, particularly the size of cattle compared to small stock, affected how risk was distributed across the population. For instance, households with a majority small-stock herd were more likely to come from the poorest quantile of households, which were therefore less likely to be able to afford disease prevention measures, whereas those who owned more cattle in their herds were more able to prioritise vaccination. This can also be attributed to other factors such as cattle having higher economic returns compared to small ruminants, and they are also more likely to be owned by men who may have access to resources to invest in disease prevention.

Therefore, universalist approaches to disease risks fail to recognise how people’s livelihoods and other contextual circumstances may influence their framing and experiences of risk, and produce different vulnerabilities (Foster, 2012; Lupton and Tulloch, 2002; Douglas, 1992). Yet, and as I show in Chapter Four, risks can also be experienced collectively and in ways that both challenge and conform to expert framings. Biomedical approaches that quantify risk may justify medical intervention regardless of

whether it is effective or not, when perhaps what is needed is to frame risks in ways that are concomitant with local people's everyday experiences and to build trust between experts and lay populations so that they can work together in reducing disease risks (Keck and Lynteris, 2018; Henwood et al., 2008; Cleaveland et al., 2017).

Some like Douglas (1992) have argued that the use of the word "risk" has been about legitimising moral, social and political principles. Lupton (2013: 3) agrees that, over time, usage of the term has been modified, from the original meaning of danger, hazard and fear, to now represent deviation from the norm. Lupton (2013: 3, 7) further argues that:

This concept assumes human responsibility and that something can be done to prevent misfortune... that unanticipated outcomes may be the consequence of human action rather than the result of God's will.

The concept of God's will or accrediting hazards and danger to supernatural factors are still very much embedded in many African lay beliefs and interpretations of risk. For example, Beinart and Brown's (2013) study of lay perceptions of animal health in the Setswana-speaking areas in South Africa found that some people attributed risk of animal diseases to supernatural causes, and as something that could not be averted by human intervention. Lupton (2013) endorses this idea and is against the perception of risk as something that is associated with notions of choice, responsibility and blame. For Lock and Nguyen (2010: 305),

Danger, reworded as risk, is removed from the sphere of the unpredictable, the supernatural, the divine, and is placed squarely at the feet of responsible individuals.

This idea that risk has a moral obligation to avert danger insinuates that the individual, the social and the political body are separate, when in fact they are an inseparable whole, "surrounded by culturally defined moral problems in which power relations always have a central position" (Frankenberg, 1993: 236).

Therefore, integrated ways of combining both biomedical and anthropological methodologies of studying risk provide a better understanding of biological and non-biological drivers of zoonoses in communities that live with livestock (Keck and Lynteris, 2018; Kosoy and Kosoy, 2017; Henwood et al., 2008). This entails looking at risk in its plural dimensions, and appreciating, as Goodwin et al. (2012) have suggested, that people may be willing to accept some disease risk in order to gain other benefits.

The next section links this plurality in risk perception to plural health systems.

2.6 Health-Seeking Behaviour

This section examines the literature on illness behaviour, drawing from the fields of public health, behavioural sciences, anthropology and sociology, to provide a critical analysis of health-behaviour models and how they frame lay treatment-seeking ventures, and to apply this to an understanding of the health-seeking behaviours of the WaArusha in Naiti village.

Health-seeking behaviours are explanatory models about how patients, their families and their carers decide on what to do in the event of an illness episode (Kleinman, 1981). These models provide lenses through which lay health-seeking behaviours can be understood.

Clewley et al. (2018) define health-seeking behaviours as the sum of actions and factors that influence an individual's decision to seek initial and continued care for their perceived health status. They further argue that the utilisation of healthcare resources is a direct measure of the severity of the condition. However, as I show in chapters Five and Six, this logic does not hold for WaArusha agro-pastoralists, as their health-care utilisation is also determined by aetiologies of illness and perceptions of severity are not always based on bodily malfunction. Poortaghi et al. (2015) observe that health-seeking behaviour is also the performance of patients aspiring to have an acceptable level of well-being based on awareness of the health problem and cooperation between them and the local health systems. It is an approach through which people can monitor their bodies, distinguish symptoms and interpret them, look for medical interventions, and apply other supportive resources (*ibid.*).

Health-seeking behaviour is widely seen as a predicator of healthcare utilisation (Clewley et al., 2018). However, evidence suggests that in many rural African settings, health-seeking is not linear, and is made complex by the plurality of health systems as well as the inter- and intra-household power dynamics involved in healthcare decision making (Msinguzi et al., 2018; Atwine et al., 2015, and Chapter Six of this thesis). Dominant models of health-seeking behaviour have for a long time been criticised by medical anthropologists for their behaviourist approach to human health (Frankenberg, 1993; Calnan, 1987; Lieban, 1977; Kleinman, 1988; 1981). For example, Lieban (1977) argued

that medical models of illness eliminate patient agency. He suggested looking at illness as a broad category which is located within the socio-cultural context of a given society. Sharma (1992) discusses this in regard to the way doctor-patient relationships often subjugate patients and their knowledge and promote the medical establishment's assumption that diagnostic technologies are superior to other forms of knowledge about bodily functions. She argues for better understanding of patients' circumstances, which may contribute to disease, and for paying attention to lay explanatory models for illness causality (see also Slikkerveer, 2013). This recognition of the importance of patients' circumstances also draws on the work of Foucault (1977), who argued that power relationships affect the interaction between biomedicine experts and lay people. That is, the dominance of physicians over the sick is often sustained by the inherent power dynamic in the procedural techniques of diagnoses and labelling. For example, Kleinman (1981: 122) acknowledges that "the elicitation of patient and family explanatory models helps practitioners to take the patient's perspective seriously in organizing strategies for clinical care". These social networks between patients, family and community are, as Cockerham (2000) describes, relationships that people have during day-to-day interactions that serve as the normal avenue for the exchange of opinion, information and affection. As I show in Chapter Six, these networks are more decisive in WaArusha health-seeking behaviours than other conventional barriers. Similarly, Beinart and Brown's (2013) study of mobile herders in South Africa found these networks, which included extended family and kin, to be powerful in influencing participants' health-seeking behaviours.

Health-seeking behaviours are therefore rooted in local health systems and in specific cultural constructions of illness (Lock and Nguyen, 2010; Helman, 2000; Last, 1981; Good, 1994). However, because communities are not homogenous, health-seeking behaviour models do not explain how illness is always dealt with by all people. As I show in Chapter Six, the actions that lay people take to seek healthcare are influenced by a plethora of factors including social differentiation, household socio-economic status and power relationships between members of a household, among others (see also Lorber and Moore, 2002).

A number of models have been advanced in the field of medical sociology, behavioural sciences and psychology to help in the understanding of lay health-seeking behaviour. These theoretical models emerged in the 1960s and 1970s with the work of Zola (1966),

Andersen (1968) and Fabrega (1975), who attempted to theorise illness behaviour, albeit drawn from studies based in Western settings. Zola (1973) studied patients in an out-patient clinic at the Massachusetts General Hospital in the United States, examining their interpretations and responses to their specific illness, and showed that illness interpretation was shaped by the patient's ethnic affiliation. He argued that people's responses to symptoms were contingent upon their cultural values and beliefs concerning health – in other words, people's perceptions of what it meant to be healthy or ill. As a result, health-seeking decisions were influenced by shared beliefs about what warrants medical attention and what does not (Zola, 1973). Lay people may view being healthy as the ability to carry out daily tasks (Calnan, 1987). Indeed, as I explain in chapters Five and Six, febrile illness in Naiti was in part perceived to be normal and some febrile patients were expected to continue carrying out daily tasks.

For Andersen (1968), lay illness behaviour can be understood through analysing the cost of treatment vis-à-vis affected households' socio-economic status, while Fabrega (1975) and later Poortaghi et al. (2015) posit that illness behaviour is influenced by set rules through which illness is organised and decisions reached about how to seek healthcare. However, the most commonly applied explanatory model for illness behaviour is the health belief model.

The Health Belief Model

The health belief model was developed in the 1950s and is based on the idea that lay behaviour and motivations for decisions about seeking treatment depend on the value people place on the benefits of taking specific actions to respond to ill health (Rosenstock, 1974). Good (1994: 41) explains this further as:

Perceived susceptibility to a disease and perceived severity of that disease, combined with perceived benefits of preventive actions minus perceived barriers to taking those actions, [which explain] the likelihood of an individual taking preventive measures, complying with prescribed regimes, or utilizing medical services.

Calnan (1987) also agrees that perceived risk or vulnerability to illness explains people's health actions. He further argues that certain levels of vulnerability are associated with a greater likelihood that groups and individuals will comply with or take certain health actions. In Chapter Six, I apply the health belief model to analyse health-seeking behaviours of participants in Naiti, and I explore how lay perceptions of risk for zoonotic

infection influence interpretation of febrile symptoms and lay treatment-seeking ventures.

It is important to note, however, as Kleinman (1981: 122) argues, that health belief models may contain contradictions and shifts, as they represent “the cultural flow of life experience”. Therefore, I apply this model to my analysis of health-seeking behaviour in a way that recognises the idiosyncrasies of individual households and their members, rather than as generalising tool for all participants’ illness behaviour. As Good (1994) points out, health belief models assume that people have a variety of choices and that they can weigh the cost and benefit of each. While this may be true in many contexts, in my research in Naiti these choices were limited by compounding factors of poverty and marginalisation, social dynamics, social relationships, and complex power relations. This meant that people often used the only feasible option available to treat illness, regardless of the outcome or perceived benefits. As shown in Chapter Six, the care-seeker in many cases was not ultimately free to make voluntary choices, as is implied in the health belief theories. Similarly, in their study of lay health-seeking behaviours in Burkina Faso, Beiersmann et al. (2007) found that the mere availability of services and drugs did not guarantee people’s access to them, and that demographic factors such as households’ socio-economic status, education, household heads’ sex and age, distance to the health facility, and the quality of healthcare services influenced people’s decisions to seek healthcare. Therefore, as Poortaghi et al. (2015) urge, there is need for empirical specificity in using illness behaviour models so as to make the planning process and implementation for health interventions equitable and inclusive.

Beliefs also shift with time, and often they may adapt to and/or merge with dominant narratives about disease aetiologies. For example, in Wilkinson’s research into Lassa fever in Sierra Leone (2013), notions of the biomedical disease Lassa fever converged with local framings of fever, and lay aetiologies of “Lassa” were sometimes congruent with official prognosis of the disease. As I show in chapters Five and Six, lay aetiologies of febrile illness in Tanzania sometimes merge with dominant medical prognoses for fever.

Other research in sub-Saharan Africa has shown that people’s decisions regarding healthcare-seeking involves trust between patients and care providers (Slikkerveer, 2013; Leonard, 2007; Whyte, 2003; Bienart and Brown, 2013; Gwatkin et al., 2000). Some academics, like Bloom et al. (2008), have argued that these decisions are also influenced

by people's knowledge regarding health services. For example, although patients may understand the aetiology of their health problem, they may lack sufficient knowledge to help them match their symptoms to a particular healthcare provider. Therefore, understanding the value systems that people draw upon to treat illness in both humans and livestock can enable us to appreciate how local healthcare strategies may differ from official and dominant ones, and how the latter can be adapted to appeal to and meet the needs of local populations. I apply the health belief model to my analysis in Chapter Six to characterise the routes of treatment that are available and utilised for febrile illness, and how people make decisions regarding these treatment options. In what follows, I locate health-seeking behaviours within the literature on plural health systems in Tanzania and Africa, which I discuss next.

2.7 Pluralist Health Systems in Africa

A health system is the sum of all socially organised responses to illness and disease that constitute a specific cultural system (Bloom et al., 2008; Helman, 2001; Kleinman, 1981; 1988). Health systems in most of sub-Saharan Africa, as in society anywhere, are pluralistic (Carruth, 2014; Beinart and Brown, 2013; Slikkerveer, 2013; Whyte, 2003; Bloom et al., 2008; Munga, 2009; Marsland 2007; Leonard, 2007; Sharma, 1992). That is, in addition to the officially recognised modern medical system, a variety of traditional, local, regional and transitional systems are operational, providing populations, particularly in rural areas, with some form of care (Slikkerveer, 2013: 3). Bloom et al. (2008) argue that many developing countries' plural health systems reflect a historical legacy of the construction and subsequent decay of institutional arrangements, including healthcare. The authors suggest that in health as in other sectors, unmet demand for quality services has led to the burgeoning of non-state healthcare providers to fill the gap, including unlicensed practitioners, often untrained or minimally trained, or trained in a different form of health provision (such as ayurvedic medicine or indigenous ethnobiology), pharmacists, drug peddlers, and lay healers. Recognising this plurality of provision is necessary to appreciate the big picture of healthcare utilisation in Africa beyond the "dual-use" dichotomy of either traditional or modern medicine in these settings (Slikkerveer, 2013; Carruth, 2014; Marsland, 2007; Leonard, 2007).

Market-oriented economic considerations are often cited as important determinants of healthcare-seeking behaviour in poor communities (Young, 1982; Tibandebage and

Mackintosh, 2005). However, as I found in Naiti, cultural knowledge about disease symptomatology and meanings associated with febrile illness, gender relations, and communication between healthcare providers and patients are also important determinants of health-seeking. Similar findings were recorded by Kamat (2006) in his study of healthcare-seeking by mothers with febrile children in southern Tanzania. In addition, Leonard (2007) found that in rural Tanzania, households exhibited social learning over time in converging towards “good”, yet informal, physicians and bypassing formal healers who were perceived to provide sub-standard care. This is perhaps because the divide between “formal” and “informal” health providers in most sub-Saharan African countries is often blurred, with trained physicians operating both formally and informally, sometimes within the same spaces (Tibandebage and Mackintosh, 2005).

Formally, the healthcare system in anglophone¹⁷ African countries, such as Tanzania, is organised around the district health service, where the district level hospital provides secondary-level care while tertiary care is provided by national-level hospitals. But it is the small, often understaffed peripheral health units, such as health centres, dispensaries or community health posts, which are the first places where patients meet the formal public healthcare system (Grosskurth et al., 2013).

Under WHO guidelines (Tarimo and Webster, 1994), community health centres ought to provide the following services to meet the minimum threshold of operation:

- access to clean water and appropriate sanitation
- immunisation against (any) six major diseases
- mother and child healthcare, including family planning techniques to achieve child spacing
- prevention and control of locally endemic diseases
- health education about prevention and control of important diseases
- the provision of essential drugs.

In many countries however, chronic underfunding of health and particularly of peripheral health centres remains an obstacle for service delivery (Grosskurth et al., 2013). For instance, in Tanzania, critical staff shortages are a major challenge for access to

¹⁷ Countries formally under British colonial rule, where English is widely used as an official language.

healthcare. On average, there are 1.4 health workers per 10,000 people,¹⁸ ten times the WHO recommended ratio, and this number varies greatly between districts (Schellenberg et al., 2003; Munga and Mæstad, 2009; Leonard, 2008). These authors highlight that the situation is worse in semi-arid areas, which are typically inhabited by pastoralist and agro-pastoralists in the north of the country. These areas have the fewest skilled medical personnel (just eight per cent of all health workers per capita) (Schellenberg et al., 2003; Munga and Mæstad, 2009; Gwatkin et al., 2000).

In rural areas such as Naiti, skill-mix (the range of medical skills) inequalities have been found to be larger compared to urban areas. Health facilities in the former are dominated by clinical officers with basic training who lack capacity to deal with a wide range of health problems.

These inadequacies have driven both supply and demand for informal health providers across Africa. In many cases, traditional and/or informal therapies interact and even hybridise with biomedicine to create what Lock and Nguyen (2010: 55) term “diverse therapeutic economies”. However, the adoption of traditional treatment has also been attributed to lay perception of health risks and aetiologies of illness that are negatively associated with seeking help from trained allopathic doctors (Atwine et al., 2015). This, as I show in Chapter Six, is a greater determinant of health-seeking behaviour in Naiti than availability and access to formal healthcare providers.

Having introduced the thesis and located the core argument in the literature, I now turn to the epistemology and methods in Chapter Three below.

¹⁸ These figures are not unique, and they are similar to the rest of sub-Saharan African countries (see WHO, 2019b).

3. Chapter Three: Methodology

3.0 Introduction

This chapter outlines the methodology and methods used in conducting this study. I begin with an exploration of my epistemology. Specifically, I discuss the dilemma of studying zoonoses as an anthropologist in a context where scientific models of understanding zoonotic diseases complicate what may or may not be called zoonoses, and where categories such as “zoonoses” are unhelpful in understanding emic labels of illness. However, the premise of my methodological choices is about understanding local ways of knowing, not as a resource or in resistance to “logical” and “rational” biomedical approaches of disease contagion, but as “mutually unsettling yet always already interconstitutive modes of understanding relations between humans and animals” (Keck and Lynteris, 2018: 6). I discuss the ethnographic and mixed-methods approach adopted for this study, and outline the methods I used to collect data, along with my presentation as a researcher in the field. I conclude this chapter by discussing ethics and ethical dilemmas, and the data analysis protocols. I also reflect on the research process overall, and how I managed issues such as the power relationship between myself and my research participants.

3.1 Epistemology

It is well understood today that whilst biomedical science may be able to establish what a zoonotic disease is (in terms of its causative agent), it cannot determine what such a disease does (Keck and Lynteris, 2018). In this sense, its power is limited to establishing the ontology of the disease (*ibid.*). What remains an open question is how a zoonotic disease operates within and between human and non-human animal populations in different physical and social contexts. As a result, epidemiology has employed a wide range of disciplines in the exploration of the epidemicity and endemicity of zoonoses (Kosoy and Kosoy, 2018). The result of this has been the production of an enormous amount of data, as well as a range of methodologies and epistemological frameworks through which these have been examined (*ibid.*).

Plague scientists Micheal and Roman Kosoy (2018) problematise ideas about collecting enormous quantities of data about a disease or diseases and insist that traditional conceptual frameworks for studying zoonoses such as disease ecology are insufficient in

showing the broader picture of disease contagion. They therefore call for multidirectional and multidimensional approaches to analyses, to form a fundamental part of understanding the complexity of human-animal interaction (see also Keck and Lynteris, 2018). My methodology is therefore informed by the need to explore these complexities and to determine how they play out in lay understandings of these relationships and the risks that are produced, and which may cause febrile illness in the WaArusha population, and in their coping strategies. Understanding these complexities requires engaging with divergent and convergent framings of illness versus disease, and labelling versus diagnosing, which I discuss below.

Disease as a Biomedical Category versus Illness as a Social Construct

Despite the many ways in which we think about diseases as being unique, assumptions about the existence of diseases, including zoonoses, have a long history that may constitute significant knowledge for managing epidemics in settings such as Africa (Henwod et al., 2008; Rosenberg, 2002). Lieban (1977) emphasised the role of lay/traditional knowledge in illness labelling and aetiologies, and in defining and predicting the risk of occurrence of illness in medically underserved communities (see also Waller and Homewood, 1996; Turner, 1987; Stoner, 1986; Turner, 1967). Lay people have always used specific terms to frame their experiences of illness. They have also always distinguished different symptoms of illness and sought therapeutic practices that meet their needs (Kleinman, 1981; Good, 1994).

Throughout this chapter and this thesis, I use the term “illness” interchangeably with “sickness” as opposed to “disease”, because illness represents what the patient experiences (Kleinman, 1981). It is the subjective response of individuals and/or their carers to being unwell and it is about specific culturally-shaped perceptions and experiences of a health problem. Disease, in contrast, is a biological health problem which is objective and universal, such that a disease like colon cancer will manifest in similar ways whether the patient is in Arusha or Alabama. Kleinman (1981: 72) defines disease as the “malfunctioning of biological and/or psychological processes, [while] illness refers to the psychosocial experience and meaning of perceived disease”. I retain this distinction because, to my knowledge, a disease is a label that can only be arrived at with a diagnosis given by a medically trained health practitioner (although there are also variations, depending on training and medical practice, between countries). Illness or sickness, on the other hand, is an experience involving interpretation of one’s body signals that can be

both individually and socially constructed. Helman (2000: 83), writing about patients, explains that:

The meaning given to the symptoms [of illness] and their emotional response to them are influenced by their own background and personality, as well as the cultural, social and economic context in which the symptoms appear... This will also affect their subsequent behaviour and the sorts of treatment they will seek out.

Illness experiences are not unique to the suffering patients, because they are located in the social and cultural phenomenological contexts that are not considered by biomedical approaches to health problems (Lock and Nguyen, 2010). Helman's critique of the biomedical model (2000), organised as it is around the individual rather than the collective social life in which illness is situated, is shared by many anthropologists such as Whyte et al. (2002), Last (1981), Kleinman (1981; 1988) and Good (1994). These authors argue that lay narratives of illness may contradict or parallel biomedical understandings of illness and modalities for approaching therapy. Therapy itself is often plural, involving complex interactions with biomedicine, such as use of allopathic medicine (obtained formally or informally) and non-allopathic treatments in their various forms (Lock and Nguyen, 2010; Marsland, 2007; Whyte, 2003; Bloom et al., 2008).

Turner (1992: 161–162) emphasises the role of understanding cultural values in structuring the nature and distribution of illness. He argues that any study of health and illness experience should start by first considering, at the level of the individual, the phenomenology of illness experienced and then the way in which sickness as a category is culturally constructed and the “sick role” decided upon (see also Calnan, 1987). At the societal level, Turner argues for an examination of social norms and any deviations from these norms, as well as a focus on healthcare systems and the politics of health via a macro-analysis of the function of illness in social systems. Lorber and Moore (2002) further this argument by calling for an analysis of the role gender plays in the social construction of illness, by looking at how men and women experience illness differently in a given society.

By adopting a similar epistemological standpoint in my analyses of illness in Naiti, I aim to understand the phenomenology of febrile illness within the world of patients and their social lives (see also Whyte et al, 2002). This is a departure from biomedical models of studying health which tend to examine illness independently from the way it is framed by

patients, and which, as Turner (1992) argues, take away the agency of the sufferer or patient.

Within health systems, hybridity, or co-construction of lay and biomedical modalities, shape the health landscape in many places. For example, Lieban (1977) found in his research in the Philippines that, although it was not uncommon for local healers to refer to “TB” or “germs”, these “borrowed” terms functioned in an “alien” context and carried different connotations to those held in modern medicine. Others such as Haasnoot (2010) have found that among the Maasai in Kenya, local disease names commonly borrowed vocabulary from biomedical taxonomies. He found, for example, that typhoid fever was locally referred to as *taifod*, although he cautioned that this did not necessarily imply that the referent constituted an equivalent disease, as the Maasai could not accurately diagnose typhoid. Similarly, in this study, most labels for febrile illness show how illness is co-constructed with biomedical categories and terminology, e.g. *brusela* for brucellosis, *taifodi* for typhoid, *nimonia* for pneumonia, UTI etc., although these labels could not be medically confirmed as being equivalent to actual disease labels. This is discussed in more detail in Chapter Five.

As is clear from this discussion of indigenous labels for febrile illness, the concept of lay or “indigenous” knowledge itself is not unproblematic. Antweiler (1998) observes that the concept is often perceived to imply backward or dated knowledge in non-Western peoples (see also Marsland, 2007). Agarwal (1995) notes that indigenous knowledge differs from Western scientific knowledge on substantive, methodological, epistemological and contextual grounds, and argues that indigenous knowledge is rooted in its environment and is based on specific contextual values. Western medicine or biomedicine, by contrast, has been criticised for its insistence that bodies can be best understood as standardised entities the world over. In contrast, as Lock and Nguyen (2010: 56) argue, “virtually all other medical traditions pay careful attention to contingency when accounting for misfortune, often locating afflictions in chains of previous events; local environments... the spirit world, or an imbalance between individual bodies and the cosmos”.

There is also extensive literature that focuses on the concept of alternative or complementary medicine, especially in cultures such as the Chinese, as something which can mobilise the body’s own natural healing resources, as opposed to the use of allopathic

healing modalities (Sharma, 1992; Lock and Nguyen, 2010; Carruth, 2014; Petersen and Waddell, 1998; Senior and Viveash, 1998; Kaplan et al., 1993). In Western societies, these are more common among Western middle-class societies where the effectiveness of allopathic treatments, especially for skeleto-muscular pain such as chronic back pain, has been criticised (Petersen and Waddell, 1998; Sharma, 1992). In poor societies, alternative medicine is routinely referred to. This is because, as suggested above, informal healers are cheaper and more accessible. In this thesis, I look at how the process of lay diagnoses or labelling of illness impacts health-seeking behaviour.

The Tyranny of Diagnoses: Biomedical versus Lay Labelling of Illness

Diagnosis has always played a pivotal role in medical practice, and as Rosenberg (2002: 1) observes,

Diagnosis is inextricably related to disease specificity, to the notion that diseases can and should be thought of as entities existing outside the unique manifestations of illness in particular men and women.

Yet, as illustrated above, cultural approaches to illness as social events involving patients and their families as well as wider communities (Lieban, 1977; Calnan, 1987; Kleinman, 1981) challenge biomedical assumptions regarding the nature and specificity of disease as something that is locatable within an individual body (Rosenberg, 2002), or, for zoonoses, as hosted in natural loci (Keck and Lynteris, 2018). Disease causality in biomedicine follows a logical course involving an individual's contact with a pathogen or, in epidemiology, the way an entire community may be infected by a pathogen (Kosoy and Kosoy, 2018; Keck and Lynteris, 2018). Studies of infectious diseases such as zoonoses focus on risk factors (explained earlier) for their transmission. For example, consumption of raw milk, blood or undercooked meat as well as contact with birth fluids from infected cattle have been found to constitute important risk factors for the transmission of bacterial zoonoses such as brucellosis in Tanzania (Halliday et al., 2015; Bashaka, 2015; Cleaveland, et al., 2007; Swai and Schoonman, 2009; John et al., 2010).

However, in lay health systems, approaches to studying zoonotic disease that separate and make clear distinctions between people and livestock, and that do not investigate how lay people understand and interpret risk, or how they perceive animal illness against their own experiences of illness, may create hierarchies and threaten the harmony and intimacy of communities where animals and people are part of one social universe (Keck and

Lynteris, 2018).

Additionally, as Rosenberg (2002) has pointed out, although many of the ways in which we think about disease may seem novel, they may also have a long-standing history and understanding in lay health systems. He adds:

Laypersons and physicians have always used words to signify what seemed to constitute discrete disease experiences in their place and time. And such named disease pictures have always been important to practitioners of medicine. (Rosenberg, 2002: 4)

Similarly, lay assessments of health threats or theories of illness causation (Calnan, 1987; Kleinman, 1981; 1988) may challenge risk-factor approaches that involve purely biophysical elements of disease prevention (Frankenberg, 1993; Lindenbaum and Lock, 1993, and see Chapter Two in this thesis).

Jutel (2009) describes social diagnosis or the assigning of illness labels as providing a cultural expression of what society is prepared to accept as normal and what it feels should be treated. Diagnosis, she notes, is an important site of contest and compromise between the patient, his or her family, and the chosen healer, as well as the prescribed course of treatment. Kleinman (1988: 71–72) explains that the difficulty of lay interpretation of illness symptoms lies in the fact that the mechanisms applied are influenced by specific cultural values:

All symptoms are moulded by the illness experience. Illness usually begins with the sick person's attention to and perception of the early manifestations of disease. Personal and family beliefs and experiences and through them culture and social systems are powerful influences on this process... For instance, an individual, for entirely personal or sociocultural reasons, may evaluate early symptoms as not worth worrying about, minimal, natural or not part of sickness but presenting some other state... On the other hand, he [or she] may become frightened and view them as a threat or loss that must be immediately responded to.

Kleinman (1981) notes that illness can exist without disease or that a disease can exist without an illness, depending on whose perspective one considers. Among my research participants in Naiti, febrile illness was both perceived as “ordinary” and not needing treatment, as well as, depending on severity, a serious illness that needed presentation at a hospital. Both home and facility-based factors would impact the treatment decision,

such as access and affordability enabling treatment with biomedical therapies or requiring use of at-home treatment. Indeed, as Leach and Dry (2010: 5) elaborate,

From a perspective focussed on disease-specific interventions and biomedical control, epidemics are implicitly linked with the goal of disease eradication. From another perspective, the same diseases could be seen as part of the historical, geographical and social landscape, something to be accommodated when possible and suffered when not.

From the point of view of biomedicine, diagnosis is central to the definition and management of disease and reflects modern medicine's power to decide a name or category for what may very well be a social phenomenon (Rosenberg, 2002). But diagnosis is also as much a mode of communication as it is a mechanism for structuring bureaucratic interactions between doctors and their patients (Wilkinson, 2013; Jutel, 2009; Senior and Viveash, 1998; Kaplan et al., 1993; Rosenberg, 2002). For example, Chandler et al.'s (2008) ethnographic research into the over-diagnosis of malaria in Tanzania found that clinicians often arrived at a diagnosis that was most likely to be "accepted" by their patients. The authors emphasise that this concept of "acceptability" was reflected in the clinicians' training, which occurred in a context where the importance of malaria was strongly promoted. Secondly, the influence of peers and expectations from colleagues put pressure on health workers to conform to perceived patient preferences and led them to consider primarily malaria diagnoses. This was especially a result of shared perceptions which emphasised that malaria was easier to diagnose than other febrile diseases, that it was a more "acceptable" diagnosis, and that missing malaria was an indefensible error for a health worker to make (Chandler et al., 2008: 14). This was also largely the case in Naiti. Patients expected to be told that they had malaria if and when they presented themselves at the local clinic, because a vast majority of them (98 per cent) believed that most fevers constituted malarial illness (discussed further in chapters Five and Six).

Some authors have argued that, in most health systems, the primary consideration in lay labelling of illness in both people and their livestock is its cause (Haasnoot et al., 2010; Strang and Mixer, 2015; Casucci, 2015). Both Casucci (2015) and earlier Lieban (1977: 25) found that accrediting illness causation and cure to spiritual factors, and the belief that illness was a punishment for wrongdoing, i.e. a social sanction, was widespread in traditional nomadic societies in Kenya and the Philippines, respectively. Similarly,

Beinart and Brown's (2013) study reports that, among herder communities in rural South Africa, patients suspected that illness in livestock and people was caused by a person or people with whom they had strained social relations, and in consulting a healer, they were looking for confirmation of these suspicions and subsequent treatment. Haasnoot et al.'s (2010) study of illness perception among the Maasai in Kenya found that they believed the principal cause and origin of many illnesses to be a manifestation of punishment from *Enkai* (or "God", in the local Maa language), or the result of other supernatural powers. Bad omens or risks associated with ill health were perceived to be beyond human intervention (see also Douglas, 1992; Lupton, 2013, discussed earlier in this chapter). *Enkai* was acknowledged as the trusted creator of the rain, mosquitoes and the herd, the one who "gives life, children, and livestock" (Haasnoot et al., 2010: 17). I found this to be true amongst research participants in Naiti, where some respondents perceived sickness as *Enkai*'s will, and that humans had "no control over what *Enkai* brings to us, sickness or health".¹⁹

Self-diagnosis, and reliance on family members and social networks to diagnose illness, is also common among lay populations. Sharma (1992: 17) refers to the social networks involved in illness diagnoses as "lay referrals" (see also Feierman, 1981). Both Sharma and Feierman discuss the role of the family and kin, and the responsibilities of individual family members that influence health-seeking behaviour, associated medical activity and, by implication, medical knowledge. These networks allow input from a wide range of relatives in diagnosis, treatment and choice of treatment providers, as discussed earlier.

However, this conceptualisation of social diagnosis as providing a cultural expression of what society is prepared to accept as normal, and what it feels should be treated (Jutel, 2009), does not address problems of deviation arising from a lack of a common understanding of illnesses such as febrile illness (discussed in Chapter Five). Considering this body of previous research, in Chapter Five, I consider the convergences and divergences in the aetiologies of febrile illness in Naiti.

This thesis, therefore, is another contribution to ethnography in the context of epistemological predicament. Based on lay interpretations, it exposes the prospects and perils of transforming ethnographic interpretations into evidence about zoonotic disease. I now move on to discuss the ethnographic study and lay out the methods that I employed

¹⁹ Interview, Naiti, 26 March 2017.

to collect data in Naiti.

3.2 A Mixed-Methods and Ethnographic Approach

The overall methodological approach for this research is mixed-methods, with ethnography at its core. The methods that I drew upon included survey techniques, semi-structured and open-ended interviews (key informant and in-depth), and ethnographic observations in various local settings, including of clinical diagnoses at a local health dispensary in Naiti.

The decision to combine qualitative and quantitative methods was not merely to provide comparison of findings, but was, as Pope and Mays (2006) frame it, an attempt to explore complex issues by means of methodological diversity. However, I am cautious of the distinction between qualitative and quantitative research, which, as de Vaus (2014) rightly observes, is frequently unhelpful and misleading, because the two can be used to enhance the specific data objectives of a given study. Therefore, rather than apply these methodologies as separate from each other, I used them as complementary tools to help me get the most depth out of my research endeavour.

As the central aim of the thesis is to understand everyday local experiences of risks from human-animal interaction, febrile illness and health-seeking behaviour, ethnographic and participatory survey methods were necessary to capture the necessary descriptive detail, and for methodological triangulation (Jick, 1983). Denzin (1970) argues that triangulation serves to confirm a phenomenon using various data gathering techniques. However, as Arksey and Knight (1999: 20) caution, “the individual strengths, weaknesses and bias of the various methods must, first, be known, and secondly, applied in such a way that they counterbalance each other”. Similarly, for Young (2004: 4), “complexity of methodology must match substantive complexity”.

Ethnography is defined by Boellstorff (2007: 11) as “both an epistemological approach and a linked series of methods, with ‘participant observation’ as the key practice”. Arguably, the most influential and controversial published work on ethnography is *Writing Culture*, a book by Clifford and Marcus (1986) which has influenced the way many anthropologists write about culture. The authors place ethnography at the centre of a new intersection of social history, interpretive anthropology, travel writing, discourse theory and textual criticism. This definition of ethnography as “writing culture” is an

appropriate one because it posits that, in conducting ethnography, one does not just observe and describe, but also one interprets and presents other people's "culture" (Geertz, 1973). Wilkinson (2013: 54) extends this argument by noting that ethnography is "the process of observing and interpreting 'culture' in its natural setting and producing a written account of it as far as possible from the perspective of the people whose culture it is".

In following these principles, ethnographic observation became a critical tool of my research. As Agar (1996: 31) illuminates:

[Participant observation] simply codes the assumption that the raw material of ethnographic research lies out there in the daily activities of the people you are interested in, and the only way to access those activities is to establish relationships with people, participate with them in what they do, and observe what is going on.

Following this view, throughout the time I spent in the village, I filled out 146 field diary entries with notes from participant observation. I accompanied herders to the grazing fields on many occasions, where I observed food habits and human-animal interactions, for example people's relationship with animals, especially when they fell sick, gave birth or died during herding hours. In the village and nearby fields, I observed and participated in work (helping to hoe the land or plant food crops) with both women and men. In forests, I observed and asked questions about the medicinal plants that were foraged to treat fevers and other ailments. I noted milk consumption habits of families in and out of their homes, and when it was boiled or consumed uncooked, in what form, where, when and by whom. I observed men when they butchered animals (both sick and healthy) for various ceremonies, including after the birth of a baby or for circumcision, death and burial rituals, and for use in conflict resolution. I also observed meat inspection (by elderly men who cut open dead animals and inspected the offal) for signs of disease contagion and saw what happened to the meat if it was infected. I attended consultations between the physician in the Naiti health dispensary and his patients, and analysed patient clinical records. I also observed interactions between patients and their caregivers at the clinic and afterwards in their homes, in order to understand how they interpreted the diagnoses and what treatments they sought.

These opportunities offered me access to "sufficient proximate experience of the everyday circumstances in which people learn and tell their stories," (Gubrium and

Holstein, 2012: 38). I achieved this by living in a hut in the village (see Figure 3.1), where there was no clean water, no electricity, no infrastructure, no heating, and where wild animals including elephants, zebras and sometimes hyenas roamed. I was able to observe daily life and people's everyday activities and behaviours. I faced challenges and hardships, including a limited diet based on animal products and cornmeal, as well as isolation, as I had no phone or internet access over long periods, and thus was out of touch with my family and social and professional networks.

Figure 3.1: The Hut where I Lived During Fieldwork in Naiti.



At the same time, living in the village enabled me to trust and be trusted by my informants and hosts, and to develop collegial relationships, to understand animal-human relationships in an entirely new way, and to put into perspective my own ways of living. All these things helped me navigate the rest of the research process, and my academic and personal life thereafter.

As Denzin and Lincoln (2000) argue, research methods are decided upon based on the subject of study, i.e. whether the phenomenon under study is essentially convergent or a more individualistic social phenomenon. Arksey and Knight (1999: 10) agree that

competing theories of being (ontology) and knowledge (epistemology) have implications for the research methods used in social research. Therefore, in order to blend and integrate different methods, and not merely to design a study that comprised distinct, mutually exclusive approaches, I integrated the use of ethnography with survey techniques, interviews and focus group discussions as a way to give attention to “the differences and particularities in human affairs... what people think, what happens and why” (Arksey and Knight, 1999: 10).

Ethnography and mixed methods enabled me to achieve greater completeness. I approached the research questions from various angles and brought together a range of views that captured the social complexity of studying human-animal interaction and health and illness. Sometimes these views were not consistent. There were cases where the same respondents shared different views while answering the same questions under different methods of enquiry. For example, one respondent indicated that they did not own livestock in the survey questionnaire but admitted to owning “a few goats and sheep” during an in-depth interview on a different occasion. These multiple viewpoints were helpful in enabling me to explore respondents’ attitudes and beliefs and understanding the basis of their responses. For instance, I noticed that some respondents were hesitant about discussing their herd sizes with me. Some either refused to answer the question or simply mentioned an approximate number. One participant explicitly challenged me by asking how I would have felt if he asked me to disclose my bank balance to him, an opinion which I thought was fair. However, with time, and as people got to know me and understand my research agenda, they became much more open about the subject of livestock ownership. And at the same time, I also learned that ownership was not as straightforward as I had assumed, and in Naiti, as is the case in most livestock-keeping communities, gender dynamics played a significant role in defining what ownership implies. For instance, a vast majority of female respondents said they did not own any livestock, although they would sometimes say they owned the milking cows. One woman told me, for example, that:

I don’t *really* own our livestock. However, I know they are mine because my husband allocated them to my house, but I do not control what happens to them. So, if you need to know how many we have, ask my husband...²⁰

²⁰ Interview, Naiti, 12 July 2017.

As this example shows, “ownership” is a problematic concept, especially in communities like Naiti where gendered resource allocation implies women having access to livestock but not actually owning them. This is not new and is consistent with what many researchers working in these settings have found (see for example FAO, 2018; Njuki and Sanginga, 2013; ILRI, 2012; Hodgson, 2000; 1999). I return to livestock and other asset ownership in Section 3.2 below.

To sum up why I decided on ethnography as a methodology, my aim was not to produce a generalisable explanation of human behaviour. Rather, I sought to explore in detail the particularities of individual and group behaviours, and their implications for zoonoses research, health systems research and One Health interventions in public health challenges. This is because illness is fundamentally social, cultural and political, but also experienced personally, and so it can only be understood by being observed in a “naturally” occurring environment (see Kleinman, 1981; Atkinson and Hamersley, 1996). Without seeing how people behaved in everyday contexts, and without having some experience of these contexts myself, I would be unable to answer my research questions.

Although at times it seemed as though different people gave me contradictory messages about various aspects of my questionnaire, I became interested in these divergencies because, as Arksey and Knight (1999: 22) also point out,

Even if the data pull in different directions, it is likely that investigating the reasons for the discrepancies will shed light on processes that otherwise might not have been recognized... divergent results can be equally fertile areas for theory-building, policy and practice.

3.3 Demography of Research Participants

As Table 3.1 below illustrates, 200 households or *olmareis* were purposively sampled, and either the household head or their spouse responded to the questionnaire. Purposive sampling, as I explain later enabled me select participants that best represented the parameters that I was interested in (see Silverman, 2014; Bernard, 2006) on purposive sampling techniques.

In many cases where households had more than one wife, this was taken into account, such that more than one adult responded to the questionnaire. A total of 379 people were involved (211 women and 168 men) and the vast majority of respondents (85 per cent) were aged between 18 to 55 years. The remainder of respondents were over the age of 55. This is in accordance with the 2012 national census, which shows that Naiti is mainly

comprised of a young population. The average household size varied across the wealth category, with the better-off households having on average 34 members. These included multiple wives and their children. Poor households with an average of two wives per household had 26 members, and the very poor households averaged approximately 20 members. Those households that can be described as poorest had 15 or fewer members who were mostly female (usually an elderly man, his elderly wife or wives, and their grandchildren, who were mostly girls).

Most respondents (94 per cent) were semi-literate, with only five adults in better-off households reporting having completed primary education.²¹

Table 3.1: Socio-Demographic Features of Participating Households.

Wealth Category	Count	Ave H/hold Size	Gender		Average Education	Livestock Ownership				Land (hectares)	Other Assets
			Male	Female		Cattle	Small Stock	Donkey	Poultry		
Better off	14	34	12	22	5 members: secondary Others: basic	21	80	3	50	6 - 10	3 mobiles Radio 1 motorcycle
Poor	126	26	9	17	Basic	12	30	2	30	3 - 6	2 mobiles
Very poor	41	20	6	14	Basic or nil	3	15	0	20	2 - 3	1 mobile
Poorest	19	15	4	11	Nil	1	12	0	12	1 or 0	Nil

Household Wealth Categories

As illustrated in Table 3.1 above, nearly all participating households owned land and livestock, including cattle, small stock, donkeys and poultry. However, these assets varied significantly across the wealth categories. I classified households into four categories based on the herd size and species composition, land in hectares, and other assets. This data was obtained from the survey questionnaire, in which respondents were requested to list the amount of livestock they owned and by species. The list was corroborated with focus groups who agreed on relative wealth categories.

In general, apart from a few households (seven per cent) that were relatively better-off, the significant majority of households (93 per cent) could be categorised as poor, with the poverty gradient varying slightly depending on the size of the households. Typically, as illustrated in the table above, the better-off category (14 households out of 200 sampled) owned on average 21 cattle and 80 small stock, three donkeys, and approximately 50

²¹ Primary education in Tanzania is seven years, with the average age of starting school being six years old.

chickens. These households also owned between six to ten hectares of land, a radio, three mobile phones (at least one of these was owned by the head of the household), and, in five of the 14 households, a motorcycle. However, they also had the largest family sizes, an average of 34 members, due to having multiple wives and children. As such, it was not possible to establish how these assets were distributed to each wife and her children, and, as I learned, this information was sensitive because although husbands always claimed to distribute household wealth to their wives equally, there were discrepancies on the allocation based on a number of factors, such as a wife's position and influence in the family, number of children (especially boys) that a wife had, age of the wife, and so on.

The second wealth category constituted the poor (63 per cent), who owned on average 12 cattle and between 30 to 50 small stock, three to six hectares of land, two donkeys, between 20 to 30 chickens, and two mobile phones, one of which was owned by the husband and the other by either one of the wives or an adult but unmarried son. The average family size of these households was 26 members. The third category is very poor, and these comprised 21 per cent of all the sampled households. They owned on average three cattle and 15 small stock, 20 chickens, and two to three hectares of land, one mobile phone, which was usually owned by the husband, and had a household size of 20 members. The fourth category or ten per cent of the total households sampled can be described as poorest. These households were typically headed by elderly men who lived with their elderly wives and young grandchildren. They owned just one or two cattle and 12 small stock and less than ten chickens. They either did not own any land, or they had less than one hectare. The sizes of these households were relatively small, with 15 members.

Using a Tropical Livestock Unit (TLU)²² conversion factor for cattle = 0.7 TLUs, sheep = 0.10 TLUs, goat = 0.10 TLUs and chickens = 0.01 TLUs (FAO 1987), the average TLUs in the very poor and poorest households is less than three, while for those in the middle or the poor, the TLU is 12 and for the better-off households the average TLU is 22.

²² A TLU is a unit used to measure real-time livestock wealth estimates, and is commonly taken to be an animal of 250 kg live weight (FAO, 1987). Using this measurement, one cattle is equivalent to 0.7 TLUs, while a sheep or a goat equals a TLU of just 0.10.

The FAO's standard TLU valuation categorises livestock wealth as follows: poor people will have less than five TLUs per household, those in the middle will hold between five and 13 TLUs per household, while the better-off will have at least 13 TLUs per household (Grandin et al., 1991). However, these categories do not account for polygamous households such as I have described above; households in Naiti do not typically constitute nuclear compact, bounded units and as I elaborated on earlier, many households also comprise of several *ajis* headed by one household head, and distribution of household wealth is much more complex than these standard TLUs assume. Indeed, as I have illustrated, only a small proportion of the households sampled could be considered better-off due to gradations of poverty and depending on the number of wives (and their children) involved. Also, and as I explore further in Chapter Four, gender dynamics of asset ownership in WaArusha culture can disadvantage certain members of the household over others. For example, women and girls are disproportionately affected when it comes to land and livestock ownership and in settings where these are important livelihood assets, which can lead to women being destitute (see FAO, 2018; Hodgson, 2000; 1999; Njuki and Sanginga, 2013; ILRI, 2012).

In addition to land and livestock, most households in the study had a basic mobile phone (a husband always had a phone and sometimes one or more wives in a household owned a phone too). Mobile phones were useful for communication between family and friends, and were described by one young female respondent as follows:

It [mobile phone] is a lifeline that saves time and money; rather than travelling to a neighbour to borrow medicine, you can find out first if they have it and if it is useful for the illness that you or your animals have.²³

Participants also indicated that they used mobile phones to contact drug stores and consult about animal disease symptoms and seek advice on the most effective drugs to buy.²⁴

Having introduced the demographic characteristics of participants in this study, Section 3.4 below describes the methods that were used to collect data.

²³ Interview, Naiti, 12 March 2017.

²⁴ Focus group discussion, Naiti, 12 March 2017.

3.4 Research Methods

Survey Methods

I developed the survey as a tool to generate data on all the key research themes in the thesis, which are explored in more depth using qualitative research tools. The survey questionnaire included five modules: livelihoods (how families derive a living, including food, shelter, water, medicines), human-animal interaction (who, where, when human-animal interaction occurs), framings of risk for zoonotic disease (what is risky and what is not, how different people perceive risks of animal illness, and how risk is managed locally), experiences with febrile illness (including lay interpretation of symptoms and labelling for febrile illness), and healthcare-seeking behaviour (where people seek treatment and how decisions are arrived at). Each of these was further broken down into specific questions that allowed for brief responses (both qualitative and quantitative), following Sudman and Bradburn's (1982) guidelines on designing a research questionnaire. These include analysing the concepts involved in the research questions, formulating specific questions, and measuring these against the concepts in order to check for ambiguities and vagueness. As Sudman and Bradburn (1982: 12) explain, "the more clearly formulated and precise the research question, the more easily the actual questions can be written, and the questionnaire designed".

However, as Bernard (2006) points out, surveys need not necessarily be about quantifying research, but can also provide a basis upon which in-depth interviews and content analysis can be enhanced. In my case, I used the survey to collect information about various aspects of my study, and then selected a sub-sample of respondents for in-depth qualitative study that followed on from the survey, throughout the ten months that I spent in the village.

Survey responses were recorded on a tablet using the Open Data Kit software,²⁵ co-designed by myself and a local assistant. The questionnaire included 39 semi-structured questions based on the five modules described above and was administered to a total of 200 households (these were multiple sub-households within an *olmarei*) that were

²⁵ Open Data Kit (ODK) is an increasingly adopted software for designing and implementing surveys, particularly useful where large sample sizes are involved. Due to the nature of my field sites and the fact that we did not have any means of transport other than walking for long durations between households, I decided to engage ODK to make the survey efficient and timely. The responses were immediately useable as they were all in electronic format.

purposively selected; 17 *olmareis* in each sub-village participated in this research. The time taken to respond to the entire questionnaire varied from person to person, but on average it took one and a half hours to complete.

I used the purposive sampling technique that Bernard (2006) advises, because in the case of Naiti village, the population is highly homogenous, and this approach helped to attain a sample that best represented the features that would answer my research questions. These were for example, those households that closest to a health facility and those that were furthest, or households with members involved in local administration, Christian religion, local healing etc. In many of the participant households, both the husband and wife or wives were respondents at different times, while in others only one spouse responded to the questionnaire (as in the case of widows and widowers).

I entered the survey responses into Microsoft Excel and scrutinised them for converging and diverging themes. These were then clustered into core thematic areas, which included a livelihood activity profile of each participant for a typical day, patterns of human-animal interaction, and their framing of zoonoses and risk. I also asked participants to rank febrile illnesses from the most to the least commonly experienced in their households. I probed them for corresponding symptoms, perceived causality, commonly used treatments and evaluation of these treatments. I then clustered the lists per household – where more than one adult member of the household responded to the questionnaire – and compared household-level responses against variables such as gender roles, age, wealth status, distance to health centre, education, and access to information technology such as mobile phone and radio. I used the results to generate frequency tables, which I used to identify recurrent themes that helped in exploring further during interviews, focus group discussions and participant observation.

Interviews

Most qualitative researchers endorse the use of interviews as data collection tools (Ritchie, 2003; Rubin and Rubin, 2005; Bernard, 2006; Walsh, 2001; Gillham, 2005; Denzin and Lincoln, 1994; Denzin, 1970; Pope and Mays, 2006; Gubrium and Holstein, 2004; 2012). However, few have explained what an interview is and why it is preferred. Silverman (2014: 166) invites us to think of an interview as a “keynote”, “in which the interviewer allows the interviewee freedom to talk and ascribe meanings while bearing in mind the broader aims of the project”. So, whereas in my survey design the questions

were pre-meditated and structured, interviews were collaboratively produced with respondents based on broader themes that emerged from the survey, rather than a list of individual questions. Participants in my interviews were active knowledge producers. As Gubrium and Holstein (2004: 150) put it, interviewees should never be passive “vessels waiting to be tapped”. Also, Arksey and Knight (1999: 15) note that interviews help clarify human beliefs and meanings, since “what people claim to think, feel or do does not necessarily align well with their actions”.

I interviewed a total of 73 participants that were purposively selected from the sample of 379 surveyed. Silverman (2014: 60–61) recommends purposive sampling because it

Allows us to choose a case because it illustrates some features or processes in which we are interested... it demands that we think critically about the parameters of the population we are interested in and choose our sample case carefully on this basis.

I conducted 46 in-depth interviews with 23 women and 24 men, and 26 key informant interviews with 17 men and nine women. Although I aspired to recruit an equal number of men and women to participate in the study, women often referred me to their husbands when the subject of enquiry was to do with livestock, as they believed livestock management was a man’s responsibility. A few women however did agree to talk to me, although they deferred to their husbands in some questions about animal handling and health. One woman advised me that:

If you want answers about animal sickness, the best person to ask is my husband because he oversees all animals in the *olmarei*, whereas I only look after the milking cow and goats and sheep.²⁶

Although I heeded the women’s advice, I also sought out men and women who were referred to me (by their family and friends) as key informants on specific subjects. I found these people enormously knowledgeable and I spent most of my time in the field with them. Tremblay (1957: 1) describes key informants as a select category of people who are experts in “kinship and family organization, economic systems, political structure, and religious beliefs and practices”. Marshall (1996) defines a key informant simply as an expert source of information. Tremblay (1957: 7) further highlights the characteristics of an “ideal” key informant, including the informant’s role in the community, which can

²⁶ Interview, Naiti, 3 May 2017.

be either formal or informal, and that exposes the informant to the kind of information being sought by the researcher. As Ole-Miaron (2003) indicates, a key informant should be well respected by members of his or her community as a knowledge reference point.

For me, 26 people emerged as key informants on the various themes from the survey that I needed further details on (see Table 3.2 below). These were: five lay healers, seven community elders, 13 local leaders and one clinician. Lay healers provided me with information on local therapies and emic interpretations of febrile illness and healing. I interviewed these people several times over the duration of my fieldwork.

In addition, I also interviewed various people who were selected based on their lay knowledge and experience with livestock, human health and lay healing. They included 12 febrile patients (four were ill at different periods during the study, while eight had been treated and recovered), 14 carers, two local meat inspectors (both male), 15 herders, two women group leaders, and one Christian religious leader.

I also conducted 20 focus group discussions involving 50 men and 50 women, with an average group size of five members per session. The Focus group discussions were constituted as disaggregated by sex and by gender, as was the analysis of the FGDs.

As I pointed out earlier, local leaders and elders (both men and women) and ordinary people were involved in the initial recruitment of interviewees based on their familiarity with these people's skills. They knew the customs and interactions within the village and were crucial in helping me understand the dynamics of village life. For example, they helped me understand how seasons and weather changes affected the availability of participants and thus the planning of my survey. During the rainy season (March to June 2017), more men were available to participate in the research as they tended livestock closer to home, while in the dry season these activities took them further away. Women's availability was determined by farming and trading responsibilities, which meant that they were less likely to be available during the crop planting, cultivation and harvesting season (April to June 2017). Table 3.2 below shows the interview schedules and participant samples.

Table 3.2: The Schedule and Protocol for Data Collected During Fieldwork.

200 Households (HHs): 2 respondents from 179 HHs, 1 respondent in each of remaining HHs				
Total = 379 participants	Male	Female	Total	Timeline
HH survey (all participants)	168	211	379	Oct. 2016 – Jan. 2017
In-depth interviews	24	23	47	March 2017
Key informant interviews	17	9	26	May 2017
Focus group discussions	50	50	100	May – June 2017
Observation of clinical diagnoses	20	10	30	Oct. 2016 – June 2017

All interviews were semi-structured and open-ended. Semi-structured interviews were used so as to achieve what Holstein and Gubrium (2003: 74; see also Gillham, 2005) describe as enabling “access to people’s ideas, thoughts and memories, in their own words, rather than in the words of the researcher”. Semi-structured interviews with open-ended questions are also described by Walsh (2001: 65) as enabling the “interview [process] to develop as a guided conversation, according to the interests and wishes of the interviewee”. This method of data collection was suitable for my research, which focused on people’s behaviours and actions. Furthermore, open-ended interviews were preferred to “avoid too much pre-judgement where the questions were predetermined... [and to] obtain interviewees’ real views and beliefs” (Walsh, 2001: 66). I also wanted to achieve what Seidman (2006: 15) describes as enabling a participant to “reconstruct his or her experience within the topic under study”, in this case avoiding my presumptions and focusing on what Seidman terms the “subjective experience of the participant” (ibid.: 85). The benefit of these interviewing techniques was that respondents were able to direct the interview, and this brought out information about their views, outlooks and prejudices, some of which I had not realised or considered in advance of the interviews.

The skill of interviewing involves establishing rapport with the interviewee(s) and actively listening to them. It also involves improvising where common objects are used as analogies for concepts such as illness. As an example, a local healer described his

techniques as a “cloud”, which represented the different stages of healing in his patients. He explained that:

healing is like clouds in the sky. You see them start to form, but there is no rain yet. Do not be impatient because the clouds need time to solidify into rain, just like the therapy takes time to rain life to the patient.²⁷

I used probing to encourage interviewees to give details about a phenomenon, for example short responses were followed by “please tell me more, that is interesting, and then what happened...?” In the above example, I probed for details about how the healer related his skill to a cloud and where this analogy came from, as well as other situations in which it might be applied.

Interviews were conducted in either Maa or Swahili. As I could only speak Swahili, I recruited two research assistants, one male, Lazaro Arangare, and one female, Mati Chenga, who were both proficient in Maa and Swahili, and who therefore helped me navigate the language difficulties. Lazaro was particularly instrumental since he was a Maasai and was familiar with the local WaArusha culture. Lazaro commuted from Makuyuni market where he lived and worked with me all day, every day, while Mati commuted twice a month from Arusha, and stayed in Makuyuni for the days that she assisted with the fieldwork.

A clear majority of respondents were familiar with both Swahili and Maa, and therefore it was easy for me to follow up with participants and clarify things with them in Swahili. There is no Maa or Kiswahili translation for zoonoses, so a description was used instead, i.e. illness that participants could get from livestock. I asked respondents specifically about their experiences of febrile illness or *homa* (in Swahili). Interviewees were specifically asked about what they thought caused febrile illness, how people got sick and how they responded to episodes of febrile illness in their households.

²⁷ Interview, key informant, Naiti, 15 May 2017.

Figure 3.2: Key Informant Interview with Female Lay Healer and Her Assistant, Facilitated by Lazaro (left) and the Author.



Focus Groups

A focus group is a way of collecting qualitative data which typically involves recruiting a small group of people (between four and eight) who share particular characteristics and encouraging an informal group discussion focussed around a particular subject (Silverman, 2014). In my research, it was necessary to disaggregate focus groups by sex, age and gender to respect local culture and expectations as to who might sit together for a discussion.

I conducted 20 focus groups involving 100 participants (50 men and 50 women). The average group size was five although sometimes I had four or six people per group. Focus group participants were also identified from the surveyed sample. Like interviews, discussions focussed on themes derived from analysis of the survey data and were built around concepts in my research questions. Where it was necessary and possible, visual objects were used to stimulate the discussions. For example, participants referred to “colourful maize” (a local maize variety, see Figure 3.3) to describe various stages of febrile illness, from common colds developing into malaria and into serious medical conditions. Colourful maize is a multicoloured corn variety that is traditionally popular

in Africa and is used in conversations to symbolise complexity. Participants in Naiti, for example, used it to describe the continuum of severity for febrile illness, from “normal” illness (like maize that is mainly white with only a little bit of colour) to serious illness (very colourful maize). I suspect that multicoloured corn was used in descriptions because, as farmers, this variety of corn was commonplace in participant’s homes.

Figure 3.3: Sample of “Colourful Maize” in Naiti, Used in the Analogy of Febrile Illness.



Rather than ask questions to each participant in the group, we encouraged group members to interact with each other, and I took notes on converging and diverging themes during the discussions. Effectively managing focus groups required facilitation skills, flexibility and an ability to stand back from the discussion to let group dynamics emerge (see Silverman, 2014: 166).

I used focus groups “to clarify the extent or quality [of] findings produced by other methods” (Silverman, 2014: 208), presenting participants with summarised findings from the survey, translated into the local language by Lazaro, and presented on flip charts. These group discussions also provided me with an opportunity to identify issues that participants converged around or that resulted in divergent views or opinions, and to explore these further with key informants for greater clarity. My field diaries, as described above, helped provide context for the discussions.

Upon returning to IDS in September 2017 after completing my fieldwork, I undertook further data analysis, building on earlier preliminary analysis that I had undertaken while in the field. I adopted two analytical methods, the “ideal cases” method and the “method of difference” (Sarantakos, 2013: 370). In the former, I identified cases from the data that I found to be “ideal cases”, i.e. ones where there was greater convergence in responses, and then used these cases to compare and contrast with observation of actual events and cases. For example, where a majority of respondents answered “yes” to the question “Do you consume boiled milk?” I compared this with my observation of the respondent in real-life scenarios, for example by attending meal times at their homes. This method enabled specific and unique elements to emerge that I would otherwise not have considered. For example, I realised that “boiling milk” meant something different to me and to my respondents. To some participants “boiled milk” implied “warm” milk straight from the cow, and not necessarily boiled using heat. However, this is not unprecedented, as there are similarities between boiled milk and milk straight from the cow, in that they are both warm and frothy. A significant number of respondents told me they preferred drinking “warm” milk as soon as it was obtained from the cow. They largely perceived such milk to be the “safest”, as it would not have been “contaminated” from human handling and processing. This world view may challenge the very idea of “safe milk”, in which experts promote boiled milk as safe, because the terminology, if not used carefully, may get interpreted as milk that is freshly obtained from the cow (I will return to this later).

Consequently, I adapted the question to: “Do you cook milk before consuming?”, which carried specific meanings that implied heating on a fire, and in a cooking pot. With this clarity, I began getting more insights into the complexities of consuming raw or uncooked/undercooked animal products. Some of these were that milk, meat and blood consumed as medicine are not cooked because of a belief that cooking compromises the medicinal value of these products. However, these products are cooked to “enhance their taste”²⁸ when consumed as food.

In the method of difference, I looked for similarities and differences in opinion on the same issue, and at cases that were similar in some ways and different in others. For instance, I compared responses about sources of treatment for febrile illness, from women

²⁸ Interview, Naiti, 11 February 2017.

in polygamous marriages and those in monogamous marriages, to understand how a wife's position in marriage influences her health-seeking behaviour.

For further analysis, I used the NVivo software to search for more themes and to establish common trends and patterns in the data. NVivo enabled me to identify various analytical concepts relating to my research questions and to class these into codes. Through constant comparison of the codes and the analytical concepts, and by eliminating unrelated categories (Strauss and Corbin, 1998), I constructed the empirical material presented in chapters Four, Five and Six.

In Section 3.5 below, I discuss my positionality in the field, before reflecting on the ethics and the research process in the final two sections of this chapter.

3.5 My Positionality in the Field: Female, Unmarried and Kenyan

There are mixed opinions as to whether it is better to do field research in familiar or unfamiliar settings. In my case, my field study was part of a larger project: Social, Economic and Environmental Drivers of Zoonoses (SEEDZ), which was on-going at the time. SEEDZ had classified villages in northern Tanzania, where the project was being implemented, along a pastoralist, agro-pastoralist and smallholder continuum, in order to explore and characterise drivers of zoonotic disease in different livestock systems. I chose Naiti to be the site for my fieldwork because it was part of SEEDZ and was classified as an agro-pastoralist production system. I therefore saw the village as providing a good location to explore in depth the drivers of zoonoses and illness behaviour that span the pastoral-agro-pastoral continuum.

I conducted ten months of ethnographic fieldwork between October 2016 and July 2017, which provided me with enough time to get to know the people and the community, and to understand local practices, culture, language and the local health systems. I had previously conducted fieldwork amongst livestock-keepers in Tanzania (mostly in the east and the south-east of the country) with the International Livestock Research Institute²⁹ (ILRI). At ILRI, I worked as a gender researcher, responsible for integrating

²⁹ I worked on food safety and zoonoses amongst pastoralists in Tanga and Morogoro. My work was primarily to ensure gender was integrated in this programme from the design, implementation, and monitoring and evaluation phases. For instance, I co-designed and implemented surveys that included gender-specific modules in order to understand household power dynamics and how they affected access to safe, nutritious animal-source food.

gender into research on smallholder livestock production. With this previous experience, I was not anticipating my positionality to be very different in my doctoral research, which was in relatively similar settings to where I had worked before.

However, as I demonstrate below, I had taken for granted the idiosyncrasies and cultural differences between the Maasai people with whom I had worked with previously, and the WaArusha, with whom I had little experience. Mistakenly, being a Kenyan, I assumed that I was what Acker (2001) describes as an “outside insider”, a position that is often assumed by ethnographers who tend to spend longer periods of time with the research community, learn their values and understand their culture more closely than one-off researchers conducting research for a short period of time.

I soon realised my assumptions were wrong. Although my initial reception in the village was positive (from the Ward Executive Officer and the Village Executive Officer), I found it a lot harder to build trust with local residents, especially as I could not speak the local Maa language and my spoken Swahili made me easily identifiable as a Kenyan.³⁰ Not surprisingly, Herod (1999: 320) criticises the tendency of scholars to assume a simple and clear dichotomy concerning the researcher’s positionality as being either insider or outsider, arguing that such dichotomies are misleading because “the issue of validity and one’s positionality, that is, whether one is (perceived as) an ‘outsider or an insider’ is more complex than this dualism would initially suggest”.

Indeed, for the first month I spent in the village, I was regularly referred to as “the Kenyan woman”, and try as I could to be polite (for example, greeting elderly men first and while bowing, so they can “greet” my forehead, dressing in locally-appropriate attire, and learning to speak basic Maa), I was viewed as an outsider, and one whose intentions could never be entirely trusted. For example, in the first few weeks after my arrival I was rumoured to be a government agent who was in the village to determine livestock numbers and land holdings (perhaps because I was asking these questions in the survey), and to report this to the government who would then evict people and take away their livestock. However, as I settled into the village and explained my presence, and the fact that I was part of the SEEDZ research team that had been in the village before me, people

³⁰ Although Kiswahili is the national language in both Tanzania and Kenya, there are distinguishable regional dialects of the language, including words and meanings that carry different connotations in each country.

started warming up to me and welcomed my presence and research initiative. As Plowman (1995: 20) notes, “an examination of... how participants may position you, the researcher, in terms of gender, age, ethnicity, sexual identity and class” affects the process of entry into the field.

In my case, the most problematic aspect of my identity was being female and unmarried, or without children. Unmarried women are not expected to speak to older men on their own because of local cultural norms that equate unmarried women to small children. Even after marriage, a woman’s social status can remain lower than that of older men. Social interaction in the village was highly gendered and age-based; elderly men commanded unquestionable respect and women and girls in particular were not allowed to talk to them while facing them. In communal gatherings, men and women sat in different locations, never mixing. Even in private life, a wife did not typically face her husband (and sometimes adult sons) when speaking to them. Sometimes, wives relayed information to their husbands through their sons, or other male relatives. As a result, I found myself challenged, having to explain why I was a lone female speaking to men. Wherever I went, people constantly enquired “where is your husband and your children?”. Most of the people that I spoke to in the village were genuinely shocked that I had neither a husband nor children. Several men offered to marry me so I did not have to be alone. These remarks were made to me both jovially and seriously, which both amused and upset me, but I accepted this to be a common and expected part of conducting ethnographic research.

Another challenge was that some respondents perceived that my research would lead to tangible communal benefits. In one instance, a woman asked me if I could “stop the fever”. And when I replied that I couldn’t, some participants demanded payments before taking part in the study, and although I offered small tokens in the form of lunch or small household items like tea, sugar or a bar of soap to every home that I visited, some men perceived these gifts to be “women’s items” and frequently asked me for money for themselves.

However, things were made easier for me by my Maa-speaking research assistant Lazaro, who worked with me throughout my field study. Lazaro was a local from the

neighbouring district of Simanjiro,³¹ and besides accompanying me and showing me all the footpaths in the village, he also helped with translations and educating me on the Maa-speaking culture. Educated and working with a woman, Lazaro was locally viewed with both curiosity and admiration, particularly among the young men who wanted to be like him, but also could not understand why he worked with me, contrary to the local customs in the area. Overall, however, his presence, it seemed, made people take me and my research seriously. He also made it easy for me to speak to older men who would otherwise not easily have spoken to me.

Mati, my female assistant, helped with organising women-only focus group discussions and co-facilitated these with me, since she could speak both Maa and Swahili. However, as she lived in Arusha and had other commitments, Mati could only commit a week in each month to assist with field work.

Figure 3.4: Lazaro and the Author Conducting a Men-Only Focus Group Discussion with Community Elders.



³¹ About 200 km away (where people transferred their livestock for grass during the dry season, and mainly inhabited by Maasai).

I wish to note, however, that, in line with Herod's (1999) observations, my identity during the research process was not static. It kept shifting depending on who I was talking to. A few people that I spoke with had been to Kenya and they welcomed me warmly, wanting to talk about their experiences there. To these people, I emphasised my Kenyan identity as it helped me bond with them, but to others, I downplayed this, emphasising and focussing more on my previous experiences in Tanzania. Herod (1999: 321) points out that:

The researcher's positionality is not necessarily fixed in some absolute sense – 100 per cent 'outsider' or 100 per cent 'insider'. But it may translocate through categories and identities, such that at times and places the researcher may emphasize certain positionalities and identities and not others.

In summary, my positionality and navigating the entry process into Naiti can be summed up by Bailey's (1996: 50) observation that:

Gaining entry is a complicated process, and the particular route one takes to gain entry affects the rest of the research... procedures for gaining entry depend on the location of your setting and whether you are doing the research alone or with others.

For me, this also meant working with gatekeepers, defined by Bailey (1996: 51) as "individuals who play a key role in granting or denying access", both formally and informally, in order to access the field. Formally, I sought ethical clearance and obtained research permits from the national, regional and district research authorities in Tanzania,³² as discussed further below. At the village level, I worked with the Naiti VEO, with whom I first sought clearance to enter the village through the Ward Executive Office in Makuyuni, the administrative centre of the area nearby to Naiti. The VEO introduced me to the sub-village chairpersons and their assistants in each of the four sub-villages. Together, these officials assisted me with the initial selection of the 200 households that participated in the survey. Without these formal permissions, all fieldwork would have been impossible.

However, it was the informal gatekeepers who would play a key role in not only granting me access to people's homes and "hearts", but also sustaining this access for the duration

³² I obtained clearance from the Tanzania Wildlife Research Institute, the National Institute of Medical Research, the Ministry of Agriculture, Livestock and Fisheries, Makuyuni Ward Executive Office, and Naiti Village Executive Office.

of the research. These included the male community elders, such as chairpersons of age-sets, cultural leaders and assistants, who helped me immensely, because the more I settled in the village, the more trust I gained from the locals, who became interested in and even excited about my presence and research in the village.

Informal gatekeepers provided me with instrumental support in arranging for home visits to conduct interviews with participants, travelling with me and Lazaro through the difficult terrain in the village, showing me paths that were safe from wild animals and shorter routes in the village, feeding me, and informing me of and inviting me to access community events such as marriages, burials and circumcisions, where I learned more about the local culture and put into perspective the various uses of livestock in these communities. Bailey (1996: 50) describes informal gatekeepers as “people who do not have institutional power but nonetheless have informal power over your fate in a setting”. Without the informal gatekeepers accompanying me to participants’ homes on my initial visits, it is doubtful that I would have achieved my aims.

I was a constant curiosity in Naiti because, as far as I was aware, no researcher had ever before stayed in this village. Researchers were generally perceived as foreigners who made one-off visits in four-wheel drive vehicles and stayed only a few hours. People were fascinated by the fact that I stayed in a hut, which was offered to me by a family in the village. The hut belonged to a young warrior who had left to work as a tour guide in Ngorongoro conservation area, about 200 km away from the village, and he only came once to visit in the entire duration of my fieldwork, staying with family during his visit. I paid a small fee to his father, for the evening meal and for the repair of the hut when it rained and when, sometimes, the grass-thatched roof got blown off by strong winds.

I did not have a car, and so Lazaro and I walked for hours to get to households for interviews and enjoyed local meals and ceremonies. This was the real enabler for my research, to the extent that when I left for a brief break back at IDS in April 2017, my absence was noticed, and upon my return, I was greeted with sentiments such as:

We wondered if you will come back to your hut, because it is really nice to see you here. We have never seen anything like this before.³³

³³ Male informal gatekeeper, Naiti, 3 May 2017.

Perhaps I was just an anomaly who defied any known categories, yet I was allowed to stay and share in the lives of the people of Naiti.

The things I learned whilst living in Naiti are explored in the following chapters. Chapter Four starts by exploring the livelihoods in Naiti and the gendered nature of human-animal interaction, to help understand how these influence local perceptions of zoonotic risks. Chapter Five explores experiences with febrile illness, and Chapter Six characterises health-seeking behaviour for febrile illness, to determine factors that impact early presentation at health facilities, and lessons that can be learned from these.

In concluding this Chapter, I reflect on the research process and spell out the ethical clearances that were obtained for this study.

3.6 Reflexivity

Conducting anthropological research, or any qualitative research, presents opportunities and challenges regarding the representation of information because, as one immerses oneself into the lives of others, one's own assumptions, values, emotional frames and embodied orientations shape the "kind of stories he or she chooses to tell about his or her study subjects" (Gubrium and Holstein, 2012: 57). I represent Naiti village and the research participants based on what I saw and experienced through my own subjective lens, to the extent that I must now inevitably address the importance of reflexivity. Reflexivity, or turning back onto a self (Steier, 1991), involves being constantly aware of how our own prejudices and biases influence the way we conduct research, analyse material, and present the people or objects of our research. Rosaldo (1993: 19) notes that an ethnographer (and I consider myself one) "occupies a position or structural location and observes with a particular angle of vision". I am however not naïve to the fact that complete reflexivity is impossible, as I am sure that I do not know myself perfectly, nor do I always recognise my biases. The solution to this problem is not to ignore it, but instead to draw on the principles of ethnography (Boellstorff, 2007), which involve examining my own behaviour and attitude during the research process. Steier's (1991) invitation that we examine the research process, and our conversations with ourselves and with those whom we wish to "study" or "help", characterised my research process in Naiti. I realised that I and my research participants viewed each other through our own lenses and contexts, and our own humanity. The more I became involved in everyday life as a "participant", the more "human" and less technical the research became. Chambers'

(1992) advice to relax and not rush interviews, to show respect, and always be self-critically aware was instrumental, enabling me to maintain a reflexive attitude throughout the research process, including the data analysis and writing. I also took on board Bailey's (1996) advice that field research is about reciprocal relationships between the researcher and his or her research participants, because trust is not unidirectional. Bailey (1996: 60–61) reflects that:

The onus is on the researcher to be worthy of the trust, respect, goodwill of those in the setting... honesty, openness and willingness to get along are usually good places to start. In time, most people respond to genuine concern and interest in them.

Consequently, in all my engagements within the community, I tried as much as possible to be open and honest about my research schedules, including how long I was going to be in the village, what I would do and when I would leave, what people could expect my research to do and achieve and what it could not. I was candid about my research not ending fever in any way and tried to explain that I sought to cast light on the subject and build empirical understanding of the problems and opportunities that febrile illness presented. I was always aware of my privilege as a researcher who was only in the village for a defined period of time for PhD research. As much as possible, I was flexible in my schedules and respected the time and privacy of participants. As such, except for my research assistants (Lazaro and Mati), who both gave consent to identify them in my research as they felt, rightly so, that they had contributed to it, all participants are anonymous, and pseudonyms are used to protect their real identities.

Importantly, throughout the research design, fieldwork and data analysis, I was aware of the political nature of research, that knowledge production is laden with power and that the knowledge “producer” makes all the choices about how knowledge is constructed. Sarantakos (2013: 13) was right to highlight that the researcher, “wittingly or unwittingly, influence[s] the nature of the knowledge produced through the project”. For me, the whole process has been reflexive; it involved collaboration with research participants using an iterative analytical model. This entailed analysing preliminary data as it was collected,³⁴ using the principles of grounded theory (Strauss and Corbin, 1998), which include evaluating and using preliminary data as a spring-board for further enquiry, and

³⁴ Because unlike quantitative research, qualitative research data analysis is not separate or independent from the qualitative research procedure (Sarantakos, 2013: 370).

repeating the process with informants, feeding back the preliminary analysis (which I summarised in flipcharts), and using this as the basis for discussions with focus groups. These processes gave me the opportunity to discuss preliminary findings with my informants and to give them a say in my analysis and subsequent knowledge production. Many respondents reported that they benefitted from this process, which they described as empowering, as demonstrated by the following reflections from participants:

Thank you for coming back to show us what you have found. This is good because now we know you are not going to tell lies about us.³⁵

It feels nice to be reminded of what I told you many months back, I feel like you took my words seriously and this gives me a powerful feeling.³⁶

What you have recorded is true, maybe just to add that my wife would also like to hear what you wrote about the interview you had with her.³⁷

3.7 Ethics and Ethical Limitations

Ethical approvals were obtained from the University of Sussex (ER/VB96/1), the Tanzania Wildlife Research Institute and the National Institute of Medical Research in Tanzania (NIMR/HQ/R.8c/Vol.11/653). I also obtained approval from local authorities at the village level (phone calls were made to gatekeepers to introduce me), including the Makuyuni Ward and Naiti Village Executive Officers.

However, despite seeking and obtaining all the necessary ethical approvals for this study, from the University of Sussex, from the Tanzanian research authorities, and from local authorities and village leaders, in practice during the course of my fieldwork I encountered many issues that were beyond the scope of my approvals. One of these was about consent. I found that the intricacies of conducting ethnography in a remote village stretched the limits of signing consent forms in order to enable an interview (including verbal consent). Informed consent in this case was not always straightforward. As I was undertaking research in everyday settings, I had little control over who joined or who exited the research field (e.g. midway through focus groups, a friend of a friend of a friend... would come to listen in, and local etiquette dictated that I could not tell them to leave without appearing rude and without harming my chances of future access in the

³⁵ Focus group discussant, Naiti, 19 June 2017.

³⁶ Interview, key informant, Naiti, 27 June 2017.

³⁷ Interview, key informant, Naiti, 14 May 2017.

community). This is because, within the local community, villagers believe that strangers can join conversations and provide their own views, even in situations where a personal interview is being conducted. So, during my first few months in the field, I would invite someone for an interview but then they would call a friend or friends to accompany them to the meeting, and however much I insisted on privacy, the interviewee would not back down on their demands to have friends listen in. Perhaps this was also a sense of security for them, as they had no idea who I was or what I was going to ask. It was only after several months in the village (and, I believe, after trust had been firmly established) that I began having some control over the privacy of the interviews. Additionally, as I had encountered so many people casually, it became impractical to obtain consent from each and every one of them on each and every occasion without causing total chaos and disruption. For instance, on many occasions, informal discussions would occur while I accompanied herders in the fields or women collecting firewood, and this made it difficult to regularly and repeatedly obtain consent.

Another challenge was with respect to establishing the age of consent, as no proof of age records existed within the village (births mostly occur at home and are unrecorded). Both the University of Sussex and the Government of Tanzania ethics guidelines define 18 years as the age of consent, however I encountered many young married couples, living in their own households, who appeared younger than 18 years of age. Faced with many households being ineligible because of these guidelines, I consulted firstly with my supervisors both in the UK and in Tanzania, and secondly with village officials as well as senior researchers in Tanzania. I also consulted with the informal gatekeepers (cultural leaders in charge of various age-sets), who advised me on WaArusha interpretations of age and maturity. One elder informed me that “we do not use numbers here; an adult is a man or a woman whose home runs smoothly. You can have one hundred years, but you can be a child if you cannot hold your household together”.³⁸ I was subsequently informed that, in these communities, married people were seen as adults and conducted adult responsibilities in spite of their age. As a result, I amended my ethical application to the University of Sussex, which was approved, allowing me to include all married people as research participants. Also, as advised by the elders, I sought permission from the male

³⁸ Interview, key informant, Naiti, 9 March 2017.

head of the *olmarei* or from another senior male such as an uncle and older brother before interviewing younger but married participants.

I now turn to presenting the findings of this study, beginning with Chapter Four below.

4. Chapter Four: Lay Framings and Narratives of Zoonoses Risk in Naiti

4.0 Introduction

The nature of livelihoods in Naiti shapes both the lay understanding of risk and how it is managed. However, livelihoods are also gendered in ways that might lead to a variety of consequences. This chapter therefore explores lay framings and narratives about risk from human-animal interaction, to reinforce earlier arguments about risk being situated in the context in which it is experienced. Section 4.1 describes the broader risk landscape in Naiti more generally beyond just zoonotic disease risks, while Section 4.2 discusses the gendered livelihoods in the context of these risks, including seasonal and environmental shifts and how they affect human and animal health in Naiti. Section 4.3 presents the multifaceted functions of livestock in WaArusha culture and challenges the treatment of animals and humans as separate entities. Section 4.4 explores gendered patterns of human-animal interaction using daily activity profiles of men and women in Naiti in order to quantify differentiated zoonoses exposure. This section also presents lay framings and narratives of health risks and the dynamics that characterise these framings. Section 4.5 reflects on risk narratives and how they influence the understanding and interpretation of febrile illness. Section 4.6 concludes the chapter.

4.1 The Risk Landscape in Naiti

As I elaborated upon earlier in Chapter Two, health risks in resource-poor settings such as in Naiti are but one of many everyday risks that people have to manage. Risks for zoonotic disease sit within a broader risk landscape including urbanisation risks, agricultural risks associated with diminishing food production due to climatic changes (increased droughts, flooding) and land use changes as a result of broader land policy shifts in favour of commercial mining and tourism in Tanzania more generally (see for example Smith, 2012 on land-use policy changes in northern Tanzania).

WaArusha people in Naiti, as elsewhere in northern Tanzania, straddle the divide between pastoralism and agricultural production, but they remain policy absent because as a category, they are often grouped together with the Maasai pastoralists (see Chapter One on the distinction between the Maasai and WaArusha). Consequently, their unique challenges and risks, such as navigating increasing urbanisation, for example the private

excision of parts of farming land in Monduli for mining purposes (Smith, 2012) and for wildlife conservation (Goldman, Davis and Little, 2016), are often underappreciated in both academic and policy narratives. Yet these risks continue to render many WaArusha families destitute by severely decreasing land, water and pasture resources required for sustainable livestock and agricultural production. As I witnessed during my fieldwork, some of these resources are now well below subsistence needs. For instance, during my stay in the village, I found that many families no longer perceive pastoralism and agriculture as viable means to a livelihood, and therefore send their school-age daughters to work as casual labourers (e.g as domestic servants in Makuyuni town) and petty traders in simple jewellery or doing salon work in order to contribute to household food expenditures, particularly during drought periods, such as was the case in 2016/2017.

Consequently, risks associated with zoonotic disease seem quite remote compared to broader health risks including high profile diseases such as HIV and AIDS, that have been found to be prevalent in these populations (see for example similar research by May and McCabe, 2004's). Indeed, and as I will illustrate later in this chapter, many respondents seemed less concerned about human febrile illness that was the subject of my investigation but were instead more wary of “bigger” livelihoods risks affecting them and their livestock, and which had huge economic, social and psychological implications for their families.

As a result, the complexity of these risks, as Keck and Lynteris (2018: 4) rightly argue, require a great deal of collaboration across disciplines and working together with local people themselves to define priorities and find solutions to some of the most enduring risks. Certainly, this is not a simple, linear or straightforward process. Human-animal-environment-livelihood interactions are complex and require approaches that accommodate diverse views and perceptions in order to understand how and where risks are generated and developed, and to inform the design of effective ways of addressing them. I analyse some of these complexities in this chapter by exploring how risks associated with climatic variability are affecting livestock production, agriculture and therefore livelihoods in Naiti in section 4.2 below.

4.2 Livestock, Livelihoods and Seasonal Variability in Naiti

Agriculture and livestock are the mainstay of livelihoods in Naiti. However, like in many parts of the Eastern African rangelands, temporal and spatial variability in rainfall affect

forage availability, livestock production and crop production, and consequently affect people's livelihoods and health (see findings in other East African dryland pastoralist settings in; Galvin et al., 2004; Lind et al., 2016; Catley et al., 2014; Galaty, 2013; Ericksen et al., 2013). Research has shown that it is becoming more difficult for herders in East Africa to manage risks and uncertainties as their traditional adaptive strategies, such as managing breeding and herd composition, grazing patterns, and cropping in wet years, are increasingly affected by climatic variability (Ericksen et al., 2013).

In pastoralist and agro-pastoralist systems in Tanzania, seasons are generally characterised as wet and dry, with some local variations, although the semi-arid rangelands are heterogeneous in terms of the cropping and grazing activities carried out on them (Porokwa, 2003; Caudell et al., 2017). Rainfall here is patchily distributed, and average rainfall from year to year cannot be assumed for a given location (Ellis, 1994). In a normal year, the dry season typically starts at the beginning of June and lasts until October, while the wet season runs from November to May (Little, 1998; Turton, 1995; Porokwa, 2003; Caudell et al., 2017).

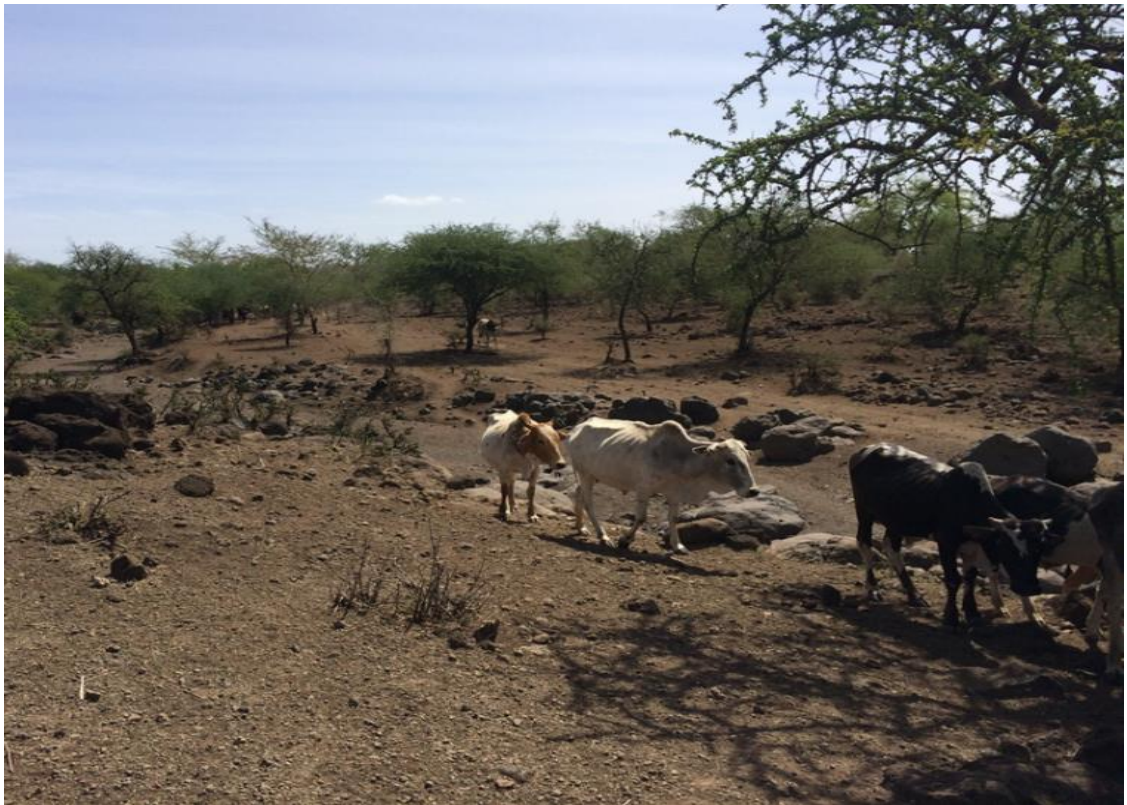
In Naiti, as in the rest of the surrounding Makuyuni-Tarangire ecosystem, rainfall patterns fluctuate, with annual rainfall averaging under 650 mm per annum, affecting the availability of pasture and water sources (see Porokwa, 2003's findings on Makuyuni-Tarangire rainfall ranges). During my fieldwork in 2016–2017, the long rains failed, and a lengthy dry season was experienced in the village, causing much hardship. Many locals likened the spell to drought conditions. During this period many men left the village, sometimes for weeks, travelling far in search of pasture for their herds. The dry season also affected agriculture, as the planting of crops was delayed, and food reserves diminished for most households.

Men and women sought casual work opportunities in Makuyuni and Arusha towns. Some men worked as security guards and women as cleaners, or they made and sold beads and other small wares. Young men frequently left the village and took up temporary jobs that offered accommodation for a few weeks or months at a time. A few men who left the village during my research went as far as Kenya to search for work (see Figure 1.3). In their absence, women took on more roles, including herding (of both cattle and small stock), charcoal burning for sale, making and selling jewellery by the Naiti-Makuyuni roadside, and selling chickens and eggs.

When the rains returned towards the end of April (five months later than expected), women began cultivating crops. Men ploughed the family home gardens using oxen-drawn ploughs and prepared it for planting, but it was the women who did the actual planting and weeding, while men, women and older children harvested crops. They cultivated vegetables, beans, potatoes and maize, which provided households with food and also, if possible, a small surplus for sale.

Seasonal patterns and the drought also affected the availability of key pasture and water resources for livestock. Milk production dropped, and many families went without milk, an essential food staple for most households in the village. With pasture depleted, the landscape turned black and gold, consisting of lava rubble and dead grass (see Figure 4.1). Only the scattered thorny acacia trees added some green to the otherwise bleak landscape.

Figure 4.1: The Landscape in Naiti During the Dry Months in 2017.



Consistent with to Catley et al.'s (2014) and Galtay (2014) observations elsewhere in the region, in Naiti, as a coping mechanism in such harsh conditions, herders traditionally transfer some or all of their stock to dry-season camps in search of pasture and water. In preparation for transferring, herds are divided into two groups. The “daily grazing” herd

includes animals that sleep in the *olmarei* or *enkang* at night, mainly milking cows, sick herds and small stock, and they forage close by for food and water during the day. The “away grazing” herd is managed by unmarried warriors or young circumcised men. The decision regarding which animals are left at home and which ones are transferred is influenced by a number of factors. Usually, a man owns the household’s herd and allocates herds to each of his wives and their sub-households. For example, if a man owns 90 head of cattle and he had three wives, each wife is allocated a relatively similar number of cattle for her and her children’s use (see also Grandin et al., 1991, on similar findings among the Maasai). However, in Naiti, this is not always the case, and as some women told me during interviews, many factors such as a wife’s position in the family, inter- and intra-household power relations, and the relationship between wives and their husband, influence how family resources such as land and livestock are allocated. Wives therefore, in principle, are not the actual owners of their allocated herds, so cannot dispose of them,³⁹ but they do have significant control over which animals remain at home under their and their children’s care. Wives are responsible for all the milk and the proceeds from any milk sales.⁴⁰ Therefore, keeping milking cows in the home is a priority, as it provides both nourishment for the family as well as income that the women can actually own and control. Many women told me that they asked their husbands to retain milking cows when other herds were transferred to the “away grazing” camps. One woman explained that:

Even though I do not own the cows, I own the milk. My husband allocated me three milking cows. The cows are owned by him, but I own the milk. I get enough to cook with, serve it to my family and in the wet season when pasture is plentiful, I usually get a little milk left over that I sell to neighbours. Sometimes if am lucky I can get up to 2,500 Tanzanian shillings a week, and this is my money. My husband never touches it because milk is a woman’s asset.⁴¹

Another woman agreed, remarking:

³⁹ Even when cattle were given to a woman as part of the bride-wealth transactions formalising marriage, these cattle remain the woman’s husband’s property, although wives can influence some decisions about the herd, for example, what to do with the money if the cattle are sold.

⁴⁰ For similar findings among herders in East Africa, see also Hodgson (1999), Njuki and Sanginga (2013) and ILRI (2012).

⁴¹ Interview, Naiti, 14 March 2017.

When animals are about to be transferred to the camps, I ensure that the milking cows stay behind because we need milk. It can be hard to feed them here, but I can borrow fodder [typically dry maize stalks mixed with salt and water] from family and neighbours to feed our cows so that they can produce milk.⁴²

The dry-season camps,⁴³ or *roncho* in Maa, are temporary enclosures made of sticks (see Figure 4.2 below), where herders and their livestock stay for a set period and move on once the surrounding pasture is depleted. Caudell et al. (2017) commented that herders can set up *ronchos* as close as 8 km from the home (*olmarei* or *enkang*) or more than 150 km away, depending on local rainfall. In Naiti, most transfers end up in the Simanjiro district, some 200 km from the village (see Figure 3.2), and herders live there with their animals for between two and four months at a time.

Figure 4.2: A Typical Dry-Season Cattle Camp.



⁴² Focus group discussion, Naiti, 14 March 2017.

⁴³ These are seasonal grazing fields where herds are kept for a period of time each year to allow pasture to regrow at home. This transhumance is used by herders as a way of managing scarce resources and sustaining cattle-keeping (Grandin et al., 1991; Little, 1998; Swift, 1988; Homewood and Brockington, 1999; Caudell et al., 2017).

While in the cattle camps, herders are involved in all aspects of livestock management, including the day-to-day care of animals, herding, milking, safeguarding against predators, checking for symptoms of disease, treatment and, when necessary, slaughtering (mainly small stock) for food while at the camp.

In their study among the Maasai pastoralists in Ngorongoro in northern Tanzania, Caudell et al. (2017) noted that the ratio of “away grazing” herds to “daily grazing” herds fluctuates seasonally. In Naiti, I noticed that animals which were too sick or too old to walk long distances are herded closer to home; women and girls typically look after them, bringing them fodder and water, while the men give them veterinary medicine bought from drug stores or borrowed from neighbours. Sometimes, during my stay, when one of these animals died, herd owners would say they died of starvation and other times attribute the death to illness or to both illness and starvation. Although a majority of those who lost livestock during the drought believed that mortality was due to starvation and malnutrition, research in similar Eastern African settings has shown that diseases such as contagious caprine pleuropneumonia in small ruminants, and contagious bovine pleuropneumonia and anthrax in cattle, may be more responsible for such mortalities than forage availability alone (Galvin et al., 2004; Catley et al., 2014; Boone et al., 2002).

Livestock mortality is a major economic, social and emotional setback. When I met Saitoti (a man in his 70s) at his home, he had lost a total of 18 livestock out of his overall herd size of 71. He lost eight cattle and ten small stock within five dry months (November 2016 to April 2017), and his remaining livestock looked emaciated. He had tried using food supplements (fodder), an option reserved for better-off local farmers, but there had been no respite. He spoke about how bad the drought was, adding that “I would rather die myself than witness all my livestock disappear”.⁴⁴

⁴⁴ Interview, Naiti, 29 March 2017.

Figure 4.3: A Carcass Lying in an Open Field in Naiti. Picture Taken 4 February 2017.



Another herder captured the seriousness of the situation:

If the rains do not come, we will die. The whole village will die. If we do not die of disease, we will die of hunger because without rains there is no grass that our cows need to produce milk, and with no milk, we will all perish. Milk is our food, it is our medicine, it is our income, and it is everything.⁴⁵

As the drought continued, the village landscape became littered with livestock carcasses (as in Figure 4.3). Carcasses were typically consumed by poorer households, and these were the vast majority in Naiti, whereas better-off households either solicited the help of an expert to determine the cause of death before eating the meat, or in most cases where the animal was considered to have died of starvation (the animal would be emaciated and very skinny), the carcasses were left to rot in the fields, and were eaten by free-roaming dogs and other predators.

A dry season also affects livestock breeding patterns. Turton (1995) posits that reproduction is the quickest way a household can increase its herd size. Among herders in Naiti, breeding involves drawing from historical experience to ensure parturition occurs at the “right” time of the year, when there is plenty of pasture and water, and lower disease risk. For example, sheep and goats are bred in the dry season to avoid susceptibility to a syndrome locally described as “coughing disease” in small ruminants,

⁴⁵ Interview, Naiti, 28 March 2017.

which is apparently low in prevalence during the dry months of the year but high during wetter months.

Interviews with elders revealed deep knowledge of these breeding patterns, although they worked best in a “normal” year when rains come as expected. Morrison and Bolger (2012) report similar findings in their work on livestock breeding among the Maasai in Ngorongoro in Tanzania.

Seasonality and rainfall variability can also have implications for the prevalence of human disease, including zoonotic disease. For example, in Naiti, it is in the dry months when animals are most often slaughtered for food, particularly those animals that are ill or weak and their death imminent. Additionally, as natural resources diminish, water becomes increasingly sought after, with livestock and people as well as wildlife, which roam the village at night, all sharing the same water points. The surface water (see Figure 4.6) could have been potentially contaminated and may have exposed people and their livestock to water-borne zoonoses. McMichael et al. (2009) agree that as climatic variability increases in much of sub-Saharan Africa, it will make major public health risks more difficult to control due to an increase in drought-related opportunistic human and animal disease.

Similarly, drought necessitates the movement of large herds to mountainous regions for pasture, where wildlife densities are higher and there is increased exposure of herders and their livestock to wildlife, and thus amplified potential for zoonoses (see related findings by Hauff, 2003; Kiffner et al., 2015; Little, 2001; 2013). In the wet season, livestock are often kept closer to human settlements, and this too presents opportunities for human-animal transmission.

Climatic variability resulting in forests becoming depleted also affects access to vital medicine, wild food and fuel wood, and thus livelihoods as well as potential for zoonoses. Catley et al. (2014) observe that food insecurity in the household often results in malnutrition and the consumption of unsafe food, which can render members vulnerable to diseases, including zoonoses (see also Thornton et al., 2011). Seasonality thus plays a significant role in how livestock are managed in Naiti and this, in turn, impacts on the role of livestock in WaArusha livelihoods and ultimately on how people conceptualise the risk of zoonoses.

4.3 The Place and Role of Livestock in WaArusha Livelihoods

Livestock carry multiple functions in East African pastoralist and agro-pastoralist communities. Livestock products such as meat, milk, blood and fat are central to the local diet. Fratkin (2001) found that milk (fresh and fermented) and milk products (fat, butter, ghee) accounted for 60 to 65 per cent of the dietary composition of pastoralist and agro-pastoralist populations in East Africa. However, among the WaArusha in Naiti today, subsistence farming is practised by nearly all families, and cereals and grains (maize), beans, and vegetables are important foodstuffs in many households, besides animal products.⁴⁶ It has also been shown that in these settings, livestock account for up to 80 per cent of household income through the sale of animals and animal products (Allegretti, 2017; Galaty, 2014).

Both the Maasai and WaArusha peoples perceive livestock functionality in similar ways (Spear, 1997; Spear and Nurse, 1992; Spear and Waller, 1993; Caudell et al., 2017). Caudell et al. (2017) compared livestock holdings of the Maasai and WaArusha. They found that while average WaArusha herds were smaller than those of the Maasai, their cultural valuations of livestock were similar. Cattle are ritually important in all rites of passage, from birth, initiation and marriage to death. In Naiti, when a child is born, an animal is slaughtered, and blood is taken from the animal and poured on the ground to signify the beginning of life. The new mother is then fed on meat and animal fat for the first month after the baby is born. Likewise, in marking the transition from childhood to adulthood through initiation, animals are killed and the blood, as well as the meat and hides, are ritually significant in these ceremonies. Both Maasai and WaArusha cultures exchange cattle as bride-wealth for daughters during marriage and during funerals (see also Fratkin et al., 1994; Galaty, 2014). In Naiti, cattle, particularly bulls, play a major role in spiritual rituals, accompanying the burial of men to honour their departed souls and the ancestors. During key informant interviews with study participants in Naiti, local elders explained that animal blood signifies important moments in WaArusha culture, for example one elder told me that,

Animal blood is sacred to us WaArusha people. We use it in many ways, especially a bull's blood. We wash initiates in it to make them brave warriors and

⁴⁶ See also McCabe (2010) on dietary diversification among livestock-keepers in northern Tanzania.

protectors of our livestock against wildlife invasion. We also splash animal blood on new-born children to protect them from harm such as illness and bad omen, and to make them strong. But ultimately, animal blood joins families together. We slaughter bulls and share a drink of blood when there are familial feuds to reconcile warring parties, or in case of death of our elders, we use animal blood to keep alive the bond between the departed and the living.⁴⁷

Negotiating Access to Livestock Products: Milk, Meat and Medicine

Livestock products in Naiti are not only used as food to sustain and nourish lives but are also a crucial source of medicine for many families. Milk, meat and fat (extracted from fresh, thick milk) are mixed with herbs to make ingestible remedies for common febrile illness in humans (discussed in more detail in Chapter Five).

As Lokuruka (2006) also observed to be the case amongst pastoralists in Kenya, in WaArusha culture, major social obligations (such as healing, reconciling with one's enemies, extending hospitality and showing respect to seniors) are performed and sustained through milk, meat and medicine. However, complex negotiations are involved in the distribution of these products within the household or during ceremonies where access to milk, meat and medicine is regulated by senior members of the community. When an animal in Naiti is slaughtered for example, male elders are responsible for distributing the meat to families, friends and neighbours. Apportionment is based on gender, seniority, respect, status and power. Meat here refers exclusively to flesh of domesticated animals (cattle, sheep and goats) and excludes wildlife (which are not usually consumed), fish and poultry. As I observed on many occasions, meat is regarded as a full meal in itself, one that is supreme and sits on top of the food and medicinal hierarchy. Senior members of the household (husbands, first wives, eldest sons) are generally apportioned the right foreleg and right ribs of the carcass, while the pelvic wing and sometimes the head is given to the youngest wife (the most recent arrival in a polygamous household). The neck and accompanying muscle is given to female neighbours and their children, and offal and fresh blood are given to nursing women immediately after childbirth. Fresh blood is also consumed by boy initiates, the sick and pregnant women and is popularly perceived to have medicinal properties, including the

⁴⁷ Interview, Naiti, 12 July 2017

replenishment of lost blood (as a result of childbirth, initiation, sickness etc) and helping the body to fight illness.

Similarly, although milk occupies a lesser status than meat among the WaArusha, it is nevertheless the most consumed food and contributes most to the households' nutritional requirements throughout the year. Women are responsible for milking and distributing milk to their households. However, while the sharing of milk is fairly straightforward compared to meat, I observed that depending on seasonal supply, portions are adjusted, and priority given to certain members of the household when milk is scarce. For example, it is generally the norm for boy herders, nursing mothers and the elderly and/or the sick to be given priority with milk when this commodity is insufficient for the rest of the household. Milk from household herds belongs to the respective wife, and as I will illustrate below, it is often the only part of the animal that women in Naiti can own, as it is seen as demeaning for WaArusha men to milk animals or be involved in its distribution (see also Lokuruka, 2006 on similar findings among the Turkana). Women provide milk for the husband and through wives and daughters, men (both young and grown) have access to milk, just as women generally access meat (and medicine) through husbands, brothers, sons, fathers and other male relatives.

Animal skin hides are also important as ornaments used to decorate milk storage gourds, as clothing and hats, and as sleeping mats, especially for initiates and elderly men. Livestock manure is the main fertiliser for family plots, and women gather and spread both fresh and dried manure on the agricultural fields before and after the planting season. Women also use fresh animal dung to construct huts for their families. Cow dung is an essential construction material, used in securing walls and roofing of huts in the village. Oxen are vital in the cultivation of food crops, as they are used as draught animals to plough family land before the planting season. Families that do not own oxen rent them from neighbours in exchange for farm produce, milk, calves or money.

As I discuss in more detail in Chapter Seven, these livestock products, particularly milk and meat (both a food and as medicine) play a significant role in conveying multiple social, economic and cultural cues in different contexts about the status, gender, wealth, and power of individuals and groups, and this has implications on how animals and animal products are perceived (by local WaArusha) with regards to zoonoses. Therefore, because animals are central to debates about zoonoses, it is essential to understand how

communities living with animals perceive them and how this perception influences food habits that may constitute risks for zoonotic disease. In what follows, I discuss further the role of different animal species in the social and cultural life of the WaArusha in Naiti.

Small stock

Small stock plays the most important animal role in sustaining daily life in Naiti. Sheep and goats are quick and easy to sell to offset small expenses and are more likely to be owned and controlled by women than are cattle. Sheep and goats are frequently slaughtered for special occasions, such as during important visits by family and friends from distant places. They are also butchered and eaten in bush parties (or *orpul* in Maa), when male peers belonging to the same age-set meet in secluded places in the forest to bond over meat feasts and to perform healing rituals. In these ceremonies, animal blood is mixed in meat soup and medicinal herbs are added. Small stock are also slaughtered for food during the dry season, especially those that exhibit symptoms of ill health. Slaughter of sick livestock, especially small ruminants, is common, and is seen as a cheaper alternative to treatment, which requires investment in veterinary drugs. Grandin et al. (1991) observe that meat from small stock for family consumption is particularly important during droughts, when it is a substitute for milk.

Sheep are generally desired for their fat, considered to be an important food for women (especially after childbirth). After slaughter, fat is extracted from the sheep, mixed with fresh blood and served to a woman immediately after childbirth, as it is perceived to help replenish lost blood, recover the woman's strength and stimulate the production of milk for the newborn baby. Fat is also used cosmetically as a beautifying ointment for initiates and for embalming dead bodies (see similar findings in McCabe, 2003; Little, 1988; Galaty, 2014).

Interestingly, recent epidemiological studies show that goats and sheep are the species that are most responsible for the transmission of human brucellosis in northern Tanzania (Cash-Goldwasser et al., 2018), which raises important questions for human health in places like Naiti, where these species have multiple functions and where sick goats and sheep are prioritised for slaughter as food for the family.

Cattle

Cattle are rarely slaughtered in Naiti, unless they are in such a poor state of health that the herd owner decides to slaughter the animal rather than leave it to die, and where

previous treatment has failed. This was a common occurrence in the dry season, where cattle were debilitated and malnourished. Cattle among the WaArusha are a symbol of prestige and status. Families that own large herds are highly regarded. They are often referred to as elders or simply as rich. It is common for less wealthy families to arrange for and encourage their daughters to marry into these families.

Cows are important in maintaining the supply of milk for household consumption and, as illustrated above, women can accrue cash income for household use through milk sales. Milk is so important that women frequently talked about how children and the elderly cannot eat meals without it. It is added to maize to make *loshoro*, or porridge, a popular day-time meal for the whole family. In a similar study on the importance of milk in pastoralist and agro-pastoralist diets, Bashaka (2015) found that among the Maasai and WaArusha in Kilosa district in Tanzania, yoghurt or fermented milk is an important foodstuff, and people use yoghurt to accompany their main dish of *ugali*⁴⁸ or rice. Yet milk or *loshoro* is far more than just a source of sustenance, as described by a respondent in Naiti:

If they [her family] do not eat *loshoro* for a day, they fall sick with various ailments. My children are used to milk; they cannot eat vegetables with *ugali*. My father in-law is the same, he would rather go hungry than eat *ugali* with vegetables. Milk is everything for us. It is food and medicine. That is why when there is no milk, everyone looks weak and easily becomes sick, but when there is milk like in the rainy season, everyone is happy and healthy.⁴⁹

To emphasise the importance of milk in the everyday household diet, over half of a typical herd is female. This pertains for both cattle and goats, as sheep are not typically milked. The poor and poorest households owned on average one or two milking cows and less than three milking goats, while the middle and wealthy households owned four milking cows and up to 11 milking goats. The wealthiest households owned an average of ten milking cows and several dozen milking goats.⁵⁰ On average, cows (which were of the Zebu variety⁵¹) produced approximately one and three-quarter litres of milk a day during

⁴⁸ Maize meal, a common main dish across Africa.

⁴⁹ Interview, Naiti, 24 March 2017.

⁵⁰ Not all milking cows and goats are in milking season at the same time. Some wealthier families do not bother milking the goats because goats yield so little milk.

⁵¹ Originally from Asia, this cattle breed is characteristic of herds held among the pastoral and agro-pastoralists of northern Tanzania. They have characteristically small slender heads, with a straight or

the rainy season and less than one litre of milk a day in the dry season.⁵² Goats yielded only about half a litre a day in either season.⁵³

The complex role of livestock in the social, economic and cultural life of the WaArusha community is reflected in the ways people relate with different livestock species in their day-to-day interactions. I alluded to this above when I discussed the ritual significance of bulls to men and the economic and dietary importance of small stock and milking cows to women. It demonstrates how patterns of human-animal interaction are gendered, and that potential exposure to sick livestock may be similarly gendered. It also has implications for susceptibility to zoonotic infections. In what follows, I discuss the gendered nature of human-livestock interactions in Naiti. I use a survey framework to quantify the patterns of interaction so as to obtain some insights into who might be at risk of exposure to potential zoonotic pathogens and why.

4.4 Exploring Gendered Exposure to Livestock and to Potential Zoonotic Infections

Social roles and responsibilities shape the way different people in Naiti village perceive risk and how they manage it. And because these roles are different according to gender and age, exposure to animals – and arguably susceptibility to zoonoses – varies. Certain people are more exposed than others. Unsurprisingly, perceptions of disease risk, and how people seek to mitigate this, also varies by gender and age.

The gender-based division of labour provides a framework for understanding the allocation of tasks and resources and how this may affect who gets sick from zoonoses. Recent anthropological studies in other parts of Africa which employ this framework show that zoonotic health risks are not equally distributed in a society, and that it is often the poorest who come into contact with zoonotic pathogens (see for example Dzingirai et al., 2017; Leach et al., 2017; Ladbury et al., 2017).

convex profile and short thick horns varying from 15 to 46 cm in length. Zebus are a preferred breed because they are adapted to live under semi-arid climatic conditions. They can be managed in times of inadequate water supply and can trek long distances in search of water (ILRI, 2012; Ole-Miaron, 2003).

⁵² Focus group discussion, Naiti, 12 May 2017. The amount of milk obtained was estimated by respondents using a milking gourd as a reference measure, and quantities were estimated rather than accurately measured.

⁵³ Interview, Naiti, 12 March 2015.

As noted by Woldenhanna and Zimmick (2015), exposure to zoonotic risks is not purely conditioned by biological processes. It also depends on what people do, with what animals, for how long and where. Therefore, to help explore the nature of gender-based exposure to animals in Naiti, I drew on Grandin et al.'s (1991) approach to quantify labour outputs of different groups in relation to livestock. This involved a survey of individuals (from the survey sample) to recall and record their activities in the preceding 24 hours and whether they would categorise these hours as typical of their average day or not. This was carried out via a survey questionnaire using descriptive open-ended questions, for example, “*Can you list the activities that you undertook in the last 24 hours, please?*”

I then aggregated the total number of hours per week spent with animals either directly or indirectly by different groups and quantified the outputs to help identify groups that spent the most time with livestock, or those whose exposure may present critical contact points for transmission of zoonotic pathogens. The results are shown in Table 4.1 below.

Table 4.1: Gender-Disaggregated Weekly Aggregates of Hours Spent in Contact with Livestock and/or Livestock Products per Household.

Task (hours per week)	Adults			Children (7-15)	
	Male		Female	Male	Female
	Senior men	Warriors			
Milking (& processing)	0	0	35	0	14
Grazing/herding	9	10	14	21	7
Watering & supervision	4	6	7	18	7
Spraying	6	3	0	3	0
Treating	15	8	1	7	0
Caring for sick animals	1	0	10	2	7
Assisting with birth	3	3	0	7	0
Slaughter/butchering	6	6	0	7	0
Clearing fresh/dried dung	0	0	17	0	8
Total aggregate hrs/week	44	36	84	65	43

As this table shows, risk of exposure to livestock disease is uneven. Because different activities carry different levels of exposure to animals, different people may be more or less at risk depending on the pathogen in question.

Women and pubescent boys spend on average more time with livestock than men and girls. Pubescent boys spend most of their time herding livestock, mostly close to the homestead, especially during the wet season when pasture and water are plentiful. Herding forms an important part of socialisation for WaArusha boys turning into young men. Like Grandin et al. (1991) found to be the case among the neighbouring Maasai, WaArusha boys from the age of three are involved in livestock routines. They herd together with older siblings or help care for sick livestock under the supervision of an older herder. At the age of six or seven years old, they become full-time herders, beginning with small stock and, following circumcision, graduating onto cattle.

Figure 4.4: Herder Boys in Naiti.



In Naiti, I observed that herding was prioritised over schooling, and the boys preferred herding to attending school because, as one parent told me, “the value of livestock is far more than education”.⁵⁴ Sometimes the boys apprenticed with an older herder, usually a father, an uncle or a brother, for some time, before they started herding independently. Sheep and goats are difficult to herd, one young herder told me, as they easily wander off and can get lost or taken by wild animals such as leopards. Consequently, goats and sheep are grazed in and around the family compound where there are more people and more domestic activity, and where leopards are less likely to hunt, and these small stocks are periodically taken to water by women and girls.

⁵⁴ Interview, Naiti, 12 March 2017.

After circumcision, the boys graduate into warriors, and their responsibilities also increase to include livestock management and finding pasture for livestock during periods of drought (see similar findings among the Maasai by Caudell et al., 2017). Unmarried warriors in Naiti are mainly responsible for transferring livestock to seasonal grazing camps during the drought season or in the period immediately after the onset of long rains, when wildebeest graze in the open fields of the village. Wildebeest are locally perceived to host *Ingati* (Maa), a syndrome that mainly affect cattle, and is characterised by symptoms ranging from “teary eyes, mucous from the nose and mouth and heavy breathing”, according to a local elder who described this sickness to me. Upon further probing and investigation, I found that these symptoms were closely associated with clinical symptoms of malignant catarrhal fever (MCF)⁵⁵(illustrated in table 4.2 further below), which can transmit to cattle through shared grasslands in the village. Therefore, transferring domestic livestock was a means of avoiding overlap between domestic herds and wildebeest, constituting a risk avoidance strategy employed by the locals (for further information on MCF in this region, see Lankester et al., 2015a; 2015b; 2016).

Warriors are also involved in resource management, including maintaining water points and livestock plunge dips. They manage communal resources, including the cattle dip in the village, although the dip was not operational at the time of fieldwork. I was told that the cattle dip was a local government initiative to help control tick-borne diseases, but it was only operational for two years (2007–2009) before lack of funds forced it to close. It is also the warriors’ duty in Naiti to find the best pasturelands and water for communal livestock. They also look after the animals’ health, using their networks of friends and kin to obtain information on animal disease in the area, including reported animal illness, and to help prepare therapies in case their own stock fell ill. Warriors graduate into senior men whose roles and responsibilities are fairly similar to those of warriors, except that they are overall managers and controllers of herds within the family.

However, although Table 4.1 show that adult men (both senior men and warriors) spend less time in contact with livestock compared to women and herder boys, their contact often involves handling fresh carcasses and blood, inhaling aerosols and sprays when treating animals, assisting with animal abortions, and inspecting animal internal organs

⁵⁵ This was confirmed by the local community animal health worker, and from the official animal health records at the Naiti village office.

when slaughtering. They also manage castration, vaccination and slaughter, when they are likely to be exposed to sick animals and possibly to zoonoses which can cause fever.

As managers of stock health, the men inspect entire herds and separate the sick animals from the healthy each morning before the herds leave the compound, and in the evenings when they return from grazing. Warriors and senior men either administer treatment (mainly veterinary) or slaughter sick animals for family consumption, depending on the type and severity of illness. Men routinely conduct preventative measures (such as spraying ticks and inoculations) and curative measures (administer injections, oral medicine, skin incisions) with their herds. Where a decision is made to slaughter cattle due to severe sickness, experienced elderly men examine the carcass and internal offal for signs of infection and advise on whether to consume the meat or to bury the entire carcass. Animals that die during grazing, as often happened in the dry season, are handled by the men.

As I frequently observed in Naiti, sick animals, not destined for slaughter, are nursed close to home by women and girls, while healthy stock graze on communal grazing fields away from home, where livestock from across the neighbourhood are herded together by a group of boy herders from various *olmareis* or *enkangs*.

As illustrated in Table 4.1, women in this study were in some form of contact with livestock, either directly or indirectly, almost every waking hour. Direct contact includes herding, inspecting milking cows for signs of ill health, caring for sick animals, milking, cleaning cow teats and removing ticks from udders (by hand) before milking (see Figure 4.5). Women's milking routines were standard across many households. At the *kraal* (Maa for "animal enclosure") during the milking process, calves and kids are lifted, carried, petted and spoken to, while the cows are stroked, pushed, sometimes beaten and sung to during milking. Kohn (2013) links intimacy between herders and their stock to broader animal-human relationships that involve material and emotional experiences shared between the animals and their keepers.

Figure 4.5: Woman Milking Cows in Naiti.



From around seven o'clock in the morning, once milking is complete, women and older girls occupy themselves in making fire, distributing the milk to household members, and preparing *loshoro* (a porridge starch mixed with fresh milk) for the herder boys who take the animals to herd in the fields for the entire day and only return home in the evening. They also prepare and ferment milk in specialised gourds, where they sometimes add herbal additives to conserve the flavour of the milk. Fermented milk or *mtindi* (in Swahili) is a staple in many households and is consumed as an accompaniment to maize-meal starch or on its own. Milk used in fermentation is typically not boiled (implies cooking, as explained in Chapter Three), because, as I was informed, cooking milk interferes with the fermentation process including altering the natural taste of milk. After the herds leave their *kraal* in the morning, women and girls clean their dwellings, clearing dung and mud into heaps and then disposing of it in the fields. Fresh cow dung is used in constructing huts and dry dung is converted into manure used in cropping.

As these findings demonstrate, women also have important roles in managing young livestock and small stock, especially sick calves, sheep and goats. They graze the animals around the family compound whilst performing other chores in the home such as cooking, cleaning, caring for the sick (both people and animals), and bringing water and firewood

from the forest. In the afternoon, they take the animals to water at the communal waterpoint. When these animals fall sick, women and girls nurse them in the family hut, where they also sleep and watch over them at night. They administer veterinary medicine, but also traditional therapies, depending on whether the illness is perceived as internal or external. For instance, external illnesses such as skin inflammation, known locally as “rough coat sickness”, is treated by rubbing hot coal on the inflamed area of the skin, while other illnesses such as fever are treated with an antibiotic injection.

Women are also involved in the sale of livestock products, including selling milk at the local trading centre in Naiti and in nearby markets such as in Makuyuni. They also take care of livestock that are expected to calve imminently and, together with the men, assist at birth.

Chicken farming is also a big part of women’s livelihood in Naiti, because chickens are typically perceived as a woman’s asset, and women enjoy significant control over income from chickens (sales and eggs), although this is meagre compared to income from the sale of cattle, for example. Some women also work outside the home, and they engage in petty trade selling beads they have made, or milk at the village trading centre (both fresh milk and fermented milk or *mtindi*). These activities are important for women as they accrue a small income that is an important determinant of healthcare-seeking behaviour, as discussed in Chapter Six.

Other sources of women’s livelihoods involve small home gardens that provide access to medicine, food and fuel wood. Forest land is a critical source of medicinal plants, which families frequently forage and use to treat febrile illness and other commonly occurring illnesses such as diarrhoea. These home gardens are broadly divided into two categories, a forest portion, left alone to grow wild plants and trees which are used as food, firewood and medicine, and a portion for subsistence farming, where families grow maize, beans, relish, beans and vegetables.

Communal land is also set aside in the village for grazing and for surface water points. These resources are communally managed by a select committee of men and women from the village. The surface water point comprises an artificial pond (see Figure 4.6) where water is pumped from a borehole to a large surface area for domestic and livestock use in the village.

This pond provides the only source of water for the village. The water point is sustained by small fees charged per *olmarei*. Herders take turns to water their stock several times a week on a rotational basis. Wildlife that roams the village, particularly during night-time, also drinks from the pond. The waterpoint is therefore a perfect site for human-animal-wildlife interaction and can potentially put people and livestock at a risk for zoonoses, with the whole village at risk of exposure. Indeed, many people desired to have separate clean water source for domestic use, and they decried the fact that the only water available was shared with animals. They were aware that this posed health threats to them but had few options for obtaining clean water for domestic use.

Figure 4.6: Artificial Pond that is Communally Used for All Water Supply Needs in the Village. Boy Herders Can be Seen Watering the Animals.



The division of labour described above is not static or universal, and there are cases where women perform what would traditionally be men's work and vice versa. As Morton and Meadows (2001) noted, as herder societies become more sedentary (as the WaArusha in Naiti are), social roles and responsibilities for groups and individuals also change. For example, Catley and Akilu (2013) researching among herder communities in Kenya found that, women's roles are changing to include breadwinner responsibilities for households that lose livestock to droughts and famine, while at the same time some

women have benefited in terms of economic advancement as they obtain access to new forms of income (see similar findings by Wangui, 2008 among Kenyan Maasai).

As such, understanding this division of labour and the impact on potential exposure to zoonotic pathogens can help in targeting interventions to the most at-risk groups, especially in resource-poor settings such as in northern Tanzania.

Having detailed livelihoods and livestock, and how they impact and are impacted by social roles and gender-based divisions of labour, the discussion now turns to how they shape the understanding and management of risks by herders in Naiti.

4.5 Exploring Lay Interpretation and Framing of Zoonotic Risks

As I elaborated on in Chapter Two, it is important that approaches that seek to minimise the risk of zoonoses in livestock-keeping populations such as the WaArusha do not frame risk as resulting from local people's lack of awareness about these diseases. Critically, as this chapter shows, people's involvement with livestock (along with the environment and other factors) shapes how they see risk and manage the potential for zoonotic disease.

Dominant framings of risk, apart from obscuring the real causes of disease outbreaks such as poverty and its conditions (Wilkinson, 2013; Leach and Dry, 2010), do not adequately consider local people's livelihoods, priorities, preferences, or concerns about their health and that of their livestock (Frankenberg, 1993). In Naiti, for example, herders conceptualised health in holistic ways which go beyond a sick cow or zoonoses and focus more on health as a form of well-being for humans and animals. But they were also concerned about the lack of resources necessary to sustain livestock, and they talked about their own precarious lives, in which health was one of many challenges. For example, one participant commented as follows:

You ask about livestock illness, yes, but what about water and land for grazing? Because when we have these, our animals are healthy, and we are healthy too. But the water we have here is dirty and we have to wash in it, water our livestock and share it with wildlife too. We do not have clean drinking water, or a functional cattle dip. Therefore, it does not matter that the cows give us illness through milk. Even if the milk is boiled, if the water

to wash the pot is dirty, people will still get sick from the water, but experts will say it is from the milk.⁵⁶

Another added that:

Well, even if we boil the milk every single time before drinking, will this end all the sicknesses? I do not believe it will, because sickness will always be there. You just have to accept it and hope that it does not kill you.⁵⁷

These remarks show that herders understand the risks associated with livestock and wildlife, as well as sanitation, food and the fact that in their living conditions disease occurrences in both people and livestock are inevitable, but that they have few options regarding how to prevent them. Indeed, they mobilised the meagre local resources, including the sharing of medicines to manage risks, in the best way they could. They also ensure that breeding occurs during times when grass is plentiful and diseases believed by locals to be prevalent during the dry season such as *emboroto* and *oltikana* (explained in Table 4.2 below), are minimal, to ensure stock productivity and health.

However, different people managed these risks in different ways based upon their livelihood roles, as I discussed above. I look at the gendered knowledge of livestock sickness below.

Awareness of Livestock Illness and Risk

Animal illness was a frequent occurrence in Naiti, and lay knowledge regarding illness, its risks and how to manage it reflects patterns of human-animal interaction that I have discussed above. During key informant interviews and focus group discussions about animal health, participants talked in detail about illnesses they believed were common in their herds such as *ormilo*, reported by nearly all participants as common in small ruminants at the time of this study. *Ormilo* was used to describe a neurological syndrome with symptoms ranging from “dizziness to madness”,⁵⁸ and was locally identifiable from the swelling of the head and “circling”⁵⁹ in affected goats but the condition was reported to be less common in sheep and cattle. Although some authors such as Queenan et al. (2017) have attributed this syndrome to the neurological disease *coenurosis*, caused by *Taenia multiceps*, it is not clear whether this is the same illness that was described by

⁵⁶ Interview, Naiti, 10 May 2017.

⁵⁷ Interview, Naiti, 4 May 2017.

⁵⁸ Interview, key informant, Naiti, 12 March 2017.

⁵⁹ Ibid.

Naiti residents. In any case there is varying understandings of *ormilo* and its etiology. For example, some like Catalano et al. (2015) described this to be a syndrome common in short-horn zebu cattle in northern Tanzania, while others such as Hughes et al. (2019) have shown that *ormilo* is more common in small ruminants in similar settings in Tanzania. Indeed, this example illustrates the pitfalls of mapping local illness terminology to biomedically-defined diseases, something which I am particularly wary of.

Table 4.2 below illustrates WaArusha emic terms that are associated with common livestock illnesses. The associated clinical signs for these illnesses (as described in veterinary literature as well as the Naiti village animal health records) are listed in the left-hand column, while common local illness aetiologies are listed across the top of the matrix. For each local syndrome, the shaded cells indicate which of the illnesses' clinical signs were reported by livestock keepers to be associated with the syndrome and/or were recorded in the village animal health records.

Table 4.2: Local illness aetiologies and their associated clinical symptoms obtained from the village animal health records.

Syndrome	Neuro-logical syndromes	Organ failure		Respiratory syndromes				
Local disease name Common zoonotic clinical signs	<i>ormilo</i>	<i>Nangida/Bruselas</i>	<i>Emboroto/engiruwadh</i>	<i>Ndorobo</i>	<i>oltikana</i>	<i>oloirobi</i>	<i>ingaati</i>	<i>Kikohozi cha mbuzi</i>
Ocular discharge								
Nasal discharge								
Fever								
Circling in goats								
Coughing								
Swelling of the head								
Skin lumps/swellings								
Rough fur								
Sneezing								
Conjunctivitis								
Dyspnoea								
Foot and Mouth lesions								
Diarrhoea								
Abortion in cows								
Enlarged & discoloured offal								
Death								

Table adapted from Jones et al (2019).

Knowledge of common animal afflictions is differentiated based on the frequency and intensity of human-livestock interaction as shown earlier in Table 4.1. For example, men are more actively involved with larger livestock, especially cattle, than women and girls. Consequently, they mentioned local illnesses including *emboroto* (some Maa versions also use *engiruwadh*, other respondents called it ‘antirax’ for anthrax), which they said primarily affected cattle. This syndrome was mentioned in 96 per cent of all males sampled but only by 29 per cent of female participants. Some of the associated symptoms of this illness such as swellings on the skin, ocular and nasal discharge and sudden death

in affected cattle, correspond to the clinical signs of anthrax (see Swai et al., 2010; Mubyazi et al., 2018; Hampson et al., 2011 on clinical features of anthrax). The illness is known to cause immediate death in otherwise healthy-looking cattle, and human consumption of carcasses of infected animals is allowed only under the supervision of experienced male elders in the village. They examine the carcass and internal offal and believe that they understand procedures for the safe disposal of infected animal organs. Consequently, *emboroto* is perceived by nearly all male participants (and the women who mentioned it) as carrying the highest risk for both animal and human health. As I explain later in this chapter, this risk is associated with the unintentional consumption of infected meat, because a sick animal was expected to display visible symptoms such as bleeding from the ear and nose and swelling of body parts, and ultimately to die within a short period of time.

Further, men (both senior men and warriors) mentioned *endorobo* (Maa) (see Table 4.2), an illness that was reported to be common in the highlands where livestock are transferred, presumably because these camps are often found where bushes are thick and which may provide habitat for tsetse flies, the main cause of this illness according to the respondents (This aetiology corresponds with clinical symptoms for trypanosomiasis, see for example Caudell et al., 2017; Catley et al., 2014; Turton, 1995).

In contrast, the vast majority of women sampled (98 per cent), mentioned small ruminant sickness such as *ormilo* (discussed earlier) as the most prevalent illness in the herd. The syndrome was common in small ruminants at the time of this study, and women often explained it to me in great detail, possibly because they mainly managed small stock that foraged closer to home. *Ormilo* was used to describe a neurological syndrome with symptoms ranging from “dizziness to madness”,⁶⁰ and was locally identifiable from the swelling of the head and “circling”⁶¹ in affected goats.

Women also talked about *nangida* (Maa, see Table 4.2) in cows, which was explained as causing malaria-like symptoms in people but the symptoms in cows were less well understood, although a few respondents mentioned that the sickness caused fever and sometimes abortion in affected pregnant cows. As many indicated, women’s knowledge of this illness was due to their greater interaction with milking cows, referred to earlier,

⁶⁰ Interview, key informant, Naiti, 12 March 2017.

⁶¹ Ibid.

and with healthcare centres (compared to men), from where they were informed about the illness' zoonotic potential through consumption of milk, by clinicians. I explore this further in Chapter Five.

Gendered knowledge of zoonoses has implications for how risks of these diseases are understood and framed, and ultimately how they are managed by the affected population. To illustrate this, I now draw from four examples of risk perceptions, showing that they are influenced by how different people interact with livestock, the environment and the local economy.

Example One: Risk as Situated Within the Environment

As a group, warriors can spend up to six months in the highland regions, where livestock are grazed during the dry season between October and May. One warrior told me about the threats that his family and herd face:

When we trek with livestock across the plains into the highlands, we face many dangers to us and to our livestock because the bushes harbour wildlife... We know that highlands are a source of livestock sickness because of wildlife. We fear wildebeest because when cattle graze on the grass where wildebeest have been, they get *ingaati* [the locally identified symptoms correspond to some of the clinical symptoms of malignant catarrhal fever], which affects eyesight in cattle, and it is also fatal. Therefore, we ensure that we do not let our livestock graze in the fields close to where wildebeest inhabit. But this is not easy at times because land is not our own so even when we take the cattle further, we can run into trouble with farmers... this disease is not a danger to us but you know, if cattle get sick and die, then we are very affected, our food, our income, our psychology... so it is a risk to us.⁶²

In this example, risk is framed as situated within the environment, in places where wildlife poses health risks for domestic stock, and as a coping strategy: herders avoid areas that are perceived to carry greater risks for wildlife zoonoses.

The warrior's perspective frames risk in a way that is shaped by his everyday life and threats to it. He sees risk from a more holistic view of health, which links cattle health to human health, and which sees animal health as informed by more than pathogens, but in terms of food and medicine as well, and as being good for herders' psychological well-being. It also points to the limits of controlling disease risk in a context in which issues

⁶² Interview, key informant, Naiti, 12 March 2017.

of land rights and ownership come into play, as in land not belonging to the herders. As Gabe (1995) also explains, this disillusionment can lead to diminishing trust in experts and authorities, due to what people may see as a lack of concern from government for the material constraints that produce health risks, such as dirty water or decreasing natural resources needed to sustain livestock in places like Naiti.

Example Two: Risk as Normal and as Something to Live With

Ndoye spends 84 hours a week in some form of contact with her 15 goats. Her husband, like several young men from the village, had left to search for work in Arusha. Ndoye accredited his decision to the dwindling prospect of livestock-keeping and crop production due to lack of or low rainfall. The family lost two cows to the 2016/2017 dry season, which she told me had died from starvation, and half of the goats had health complications ranging from *ormilo* to “coughing and fever”. I interviewed Ndoye about her perspectives on her goats’ health and the risk of her and her family catching these sicknesses. She perceived health risks as a normal and expected part of life in her village. Downplaying the risks that her sick goats posed to her health, she explained that:

I keep the sick ones in the family hut at night so that we [herself and her children] can monitor them throughout the night. I give medicine [antibiotic-tetracycline] through an injection to the goats, but if they die we eat the meat. ... [I ask her if eating meat from a sick goat was a risk for human health.] It is not a risk because we live together with the goats. If it were to make us sick, we would have to be sick everyday... my work is to make sure *ormilo* does not enter all the goats, and that is why I separate those that are infected from the healthy.⁶³

Similarly, other participants expressed that:

We have been drinking milk without cooking it since I was small, and I have never become sick because of it. I do not believe there is sickness in uncooked milk. You can see if an animal is too sick because it stops producing milk. We ask the women who milk if the cow is producing milk normally, and if it is then you have nothing to worry about the milk making you sick.⁶⁴

We eat meat, we drink milk, our women cook with fat from animals, and we spread animal butter on our bodies and even drink fresh blood, but we do not

⁶³ Interview, key informant, Naiti, 13 March 2017.

⁶⁴ Focus group discussion with older men, Naiti, 4 May 2017.

get any illness because of it. Animals are just like us, if they fall sick, you treat them, and they get better. Why should you stop eating animal products just because an animal is sick? Do you stop living with your brother if he falls sick?⁶⁵

I do not think you can get *ormilo* from the goats or sheep, because I have never seen anyone circling like the goats do, and we always eat meat from these goats when they die, or we slaughter them for food when they catch *ormilo*.⁶⁶

In these examples, locals see risk as normal, and illness as something to live with and manage where possible and hope that it does not get out of hand. Here, risk is not something external, but is to be expected, to be lived with and experienced.

These perceptions also show that risk is experienced collectively, and risk framings draw from what friends and kin have experienced, where knowledge sharing about what constitutes harm and what does not is key. Interestingly, from the first narrator's personal experience of living with sick goats and not getting sick herself, this has shaped the way she sees risk and accepts it as normal and something to live with. She could do something about it, just like she knows to separate sick goats from healthy ones, because, apparently, she understands that the illness is transferable, but she does not mitigate against the risk to her and her family's health. Perhaps it is also about what Frankenberg (1993) describes as the differences in priorities for community health, between what experts see as key and what local people themselves may perceive as important health priorities.

Example Three: Risk is Visible to an Expert's Eye and Can Therefore be Mitigated

Elder Lupeto is a respected healer who helps identify signs of common and more serious illness in people and livestock. I was invited to speak to him during an episode of suspected *emboroto* (clinical symptoms associated with anthrax) in the neighbourhood. A cow had been discovered by women during the morning milking to have lumps all over its skin, and after thorough examination by the herd owner, Lupeto was called in to help confirm the diagnosis. He explained to me that:

At first, I thought it was only lumpy skin sickness because the cow's coat was rough and covered in tiny lumps. We call this sickness "lumpy skin sickness" ... but the cow's health deteriorated quickly and within hours it was

⁶⁵ Focus group discussion with young male herders, Naiti, 4 May 2017.

⁶⁶ Interview, key informant, Naiti, 17 July 2017.

dead... When I dissected the carcass and examined the liver and the kidney, I saw *antirax* [for anthrax] with my own eyes. It was right there. I asked the men to bury all the internal offal because these are the most dangerous to the people... if you eat them you die. The rest of the meat was cooked on high heat, and it was safe to eat because the sickness was on the liver and kidney.⁶⁷

Other participants added that:

You can see *antirax* with your naked eye because of the colour of the liver and kidneys when you dissect the animal. If these organs are black in colour, the carcass should be buried, although some people eat the meat sometimes. The meat should be cooked thoroughly to kill the sickness, otherwise you can also die, just like the animal.⁶⁸

You must never ever eat the offal or carcass where *antirax* is suspected as the cause of death. The older men will know this by looking at the colour of the offal. Whenever cattle die, we call a local elder because he is more knowledgeable to examine the carcass, and if it is [anthrax] then he recommends that all the offal be thrown away. I am a victim of this because I ate the kidneys of cattle that had died from this illness and I got really sick. I nearly died. As you can see these scars [the respondent had scarring on neck and hands] came from the *antirax*.⁶⁹

We will eat the meat of a deceased animal unless we see with our naked eyes that the carcass has sickness on it, because it has changed colour, or the offal are inflamed, that is when we will agree not to consume it.⁷⁰

In these examples, risk is visible to an expert's eye and therefore there are things that people can do to mitigate against it. The fact that *emboroto* or *antirax* is visible to the naked eye makes the lay expert's diagnosis final and his expertise appear well founded. The idea of visibility of the "sickness" as in this example raises important questions. Throughout my research, many people seemed to associate "risky" diseases with *antirax*. It was the model of risk, perhaps because, along with people reporting localised outbreaks in their herds, there had been two reported major outbreaks of anthrax within a period of ten years in Tanzania, one in 1997 and another in 2007 (see also Swai et al., 2010;

⁶⁷ Interview, key informant, Naiti, 7 May 2017.

⁶⁸ Interview, Naiti, 7 May 2017.

⁶⁹ Interview, Naiti, 15 March 2017.

⁷⁰ Interview, Naiti, 12 May 2017.

Mubyazi et al., 2018; Hampson et al., 2011), as well as individual confirmed⁷¹ cases during my fieldwork. These outbreaks were highly publicised and in each of them livestock mortalities, particularly in pastoralist and agro-pastoralist systems, were high. People claimed they could identify illness on the internal offal of a carcass. This of course raises important questions about how public health messages around how zoonoses manifest in livestock and in people affect lay opinions about risk. The question to ask, for example, is what happens when pathogens are not, as many in Naiti posed, “visible to the eye”?

Example Four: Risk as Exaggerated and Potentially a Tool for Economic and Political Marginalisation of the Community

The idea of risk as a means of political and economic marginalisation was illustrated by some respondents, who stated that:

We herders are told that we are at risk of *brusela* [some called it nangida as in Table 4.2) or “*tuberculosis*” [loosely translated from close local pronunciation] because we drink milk, but are these illnesses only here or in the rest of Tanzania? We worry that they say we have this or the other sickness and this might lead to authorities coming here and killing all our cattle. We are not experts, but we know about illness and treatment that mostly affect our cattle.⁷²

If they want to end the sickness in our cattle, why are they not giving vaccines for *ormilo*? Instead, they are talking about *tuberculosis*, *brusela*, or *Rift Valley Fever*. Maybe they have a different agenda, to kill our herds. We will not accept this because they never give us anything in return.⁷³

In these examples, there are political undertones in the way risk is perceived as external and imposed by those in powerful positions. Except for anthrax, which was regarded as highly infectious to humans through eating infected internal organs, many people in this study perceived the effect of zoonoses as exaggerated and potentially a tool for economic and political marginalisation of the community. This lack of trust in experts can harm disease control efforts. As Malin et al. (2002) argue, the key to health behaviour change

⁷¹ These were cases involving two separate incidences I the village where cattle died and their owners brought a private veterinarian who confirmed that the cause of death in both animals was due to anthrax infections

⁷² Interview, Naiti, 12 June 2017.

⁷³ Focus group discussion, Naiti, 15 May 2017.

lies in the extent to which the state or government is trusted to act in the best interests of its citizens. Without this trust, people can see risk as manufactured and external (ibid.).

Lessons from Local Framings of Risk

As is evident in the above four examples, people do not always frame risk in the ways that experts do. Yet, although some may seem “irrational”, they make decisions to minimise risks and to protect their own, their families’ and their livestock’s health. These four narratives represent different positions held by people whose framings of what is happening reflect their everyday knowledge, experience and interaction with livestock.

Risk, as is clear from these examples, is not focused on a biological concept of pathogen exposure with potentially negative impacts on human health and is not focused on separating animals from humans to produce healthy humans. Rather, the relative threat of livestock sickness to herders’ health may be underplayed because local priorities are with livestock health. In a context where many problems (social, economic, environmental, political) co-exist, families must constantly make trade-offs and prioritise; illness itself can be seen as normal and an expected part of people’s lives (Leach and Dry, 2010). As Frankenberg (1993) notes, community priorities, preferences and concerns may determine which diseases are given priority and which are not, or at which level a given risk is addressed, i.e. individual, household or community. Douglas (1990) also argues that, although certain risks are real and threaten people’s lives in real ways, lay people living with these risks will take actions that protect their social cohesion and ways of living, and not necessarily those actions that protect themselves from harm. In Naiti, this is evident in the slaughtering and eating of meat during communal ceremonies and social bonding exercises such as *orpul*.

Moreover, risk is experienced socially, as illustrated by the way families consult each other to relate experiences, share medicine and arrive at a diagnosis. But at the same time risk is also experienced differently by different people, due to differences in livelihoods, and factors such as gender, discussed earlier. Therefore, Goodwin et al.’s (2012) notion of a “risk environment” is fitting in so far as it allows for an exploration of social, environmental, economic, cultural and psychological factors that contribute to disease risks in places like Naiti. This contextual approach to understanding risk may challenge biomedical models of studying zoonotic disease risks, which tend to see a pathogen as removed from the contexts of affected populations (Foster, 2012). Indeed, without

combining or at least acknowledging the different drivers of zoonotic disease and considering the central role that lay framings play in disease control, it can be inefficient and even difficult to intervene and implement measures that reduce risk (ibid.).

As Schneider (2017) also argues, people are more likely to accept familiar risks than those that are less familiar. In addition, those risks that people believe they have control over, such as by transferring cattle away from wildebeest, or when meat is buried due to risk of anthrax contagion, are more acceptable than those that are considered uncontrollable. In the second narrative above, Ndoye, as with other respondents, denied the possibility that *ormilo* could infect her family because she had not experienced anyone who got sick from this goat illness before. Starr (1969) calls this “acceptable” risk on the basis of existing social behaviour and experiential learning, which also influence people’s preferences in constructing and responding to risks.

Similarly, those animal illnesses that were perceived to be new, such as *brusela*, elicited similar sentiments, where people either downplayed the risks associated with the syndrome or were willing to take the risk; for example, one female respondent said that:

We are hearing of a new sickness called *brusela*, and that it can cause “malaria” in people. We heard from project people⁷⁴ that you get it from milk and meat if you do not cook these things properly. But how can you know if the animal has it? When my small children get hungry, I give them raw milk... this illness is very new to us and that is why we are asking each other here, if the “malaria” that is making us sick is because of the milk.⁷⁵

Furthermore, and as I alluded to earlier, people living with risk and uncertainty often have to make a trade-off between the risk and benefit of a hazard such as livestock illness. When faced with the choice between consuming animal products that might cause illness, or starvation, it is easy to see why respondents may accept certain risks. For example, Ladbury et al. (2017) found that, among the Maasai in Ngorongoro, as was the case in Naiti, families consumed products from ill livestock because the alternative was starvation. A young mother in my study captured this explicitly by stating that:

⁷⁴ This was an indeterminate term used locally to describe non-governmental agencies that either worked locally (as in the Makuyuni ward) or regionally, and who some people were aware of through trade and travel.

⁷⁵ Interview, Naiti, 12 March 2017.

Well, if you have no food to give the children what will you do? Better to get sick from the milk than to starve and die. What I fear most is to have no milk at all. Even if we get sick from the milk or the meat, at least we have it.⁷⁶

And another added that:

What can we do? This is our lifestyle and our way of life. We cannot stop eating meat or drinking milk because this is all we have. My father will not drink cooked milk. He usually says such milk has no taste.⁷⁷

These examples show that limited socio-economic alternatives can exacerbate risk exposure for certain groups of people, often the poorest, who are forced to make trade-offs involving weighing up the benefits of certain risks versus others.

Lastly, to an outsider, life in Naiti might appear remarkably dangerous and full of health risks; women and children sleeping in the same house as sick sheep and goats, warriors trekking with livestock through bushland and braving wild animals in search of pasture and water, male elders examining infected carcasses and everyone eating diseased animals. It can seem like people in Naiti live in Goodwin et al.'s "risk environment" (2012), where individuals and groups confront a wide range of potentially life-threatening risks such as zoonotic outbreaks. Yet as the examples above show, people's narratives about risk are not fixed, and are highly dependent on the particular ways in which certain individuals interact with the environment and livestock, as well as being shaped by their experience of social, economic and cultural determinants of health. In these environments, risks are, as Lupton and Tulloch (2002) note, plural and dynamic. They are also hybrid and co-constructed with ideas about the natural environment, societal expectations of different people, and general notions of well-being and of health, and based on lived experience, rather than being focused on zoonotic pathogens.

4.6 Conclusion

I began this chapter on the premise that lay people frame their everyday experiences of living with risk and uncertainty based on the type of livelihoods that they have, and that livelihoods themselves are gendered, as I have shown, and that this may have different consequences for different people.

⁷⁶ Interview, Naiti, 11 May 2017.

⁷⁷ Interview, key informant, Naiti, 4 May 2017.

This chapter has demonstrated that approaches to risk in Naiti need to consider how livelihoods shape the ways different groups of people understand and manage risk. For example, some people took zoonotic risks into account, particularly those associated with anthrax, while other zoonotic risks were dismissed as “normal” sickness in small ruminants, or *brusela* in cattle. A consistent theme from all these narratives, however, is that unknown risks are less acceptable than known risks. For instance, animals infected with suspected anthrax constitute familiar risks to human health, and Naiti’s residents show familiarity with this risk and have established ways of dealing with it, given the local context. Conversely, unfamiliar risks of infection from livestock and livestock products are less accepted as real threats; narratives of risks from illness such as *ormilo* and *brusela* reflect these perceptions.

Anthrax was known and feared because people could “see” it when a carcass was dissected and because they had seen, and could continue to see, the consequences of exposure to anthrax-infected meat or other sources of contagion. The vast majority of respondents described offal with abscesses or discolouration as dangerous to humans, and they expressed that they would not consume such offal no matter what. However, when illness was not visible, they found it difficult to link it to their own health.

In defending their food habits as not “risky behaviours” and drawing from a long history of these habits, the respondents were trying to preserve their practices and habits, and to retain an “image of themselves as competent and immune to moral rebuke or sanction” (Rodgers, 1991: 166).

Therefore, understanding these lay interpretations of risk in their multiple, dynamic and gendered forms can help in designing culturally appropriate public health messages that reduce zoonoses, as people are more likely to adopt strategies that resonate with their everyday life experiences and their own narratives (Schneider, 2017). Additionally, collective approaches to constructing risk, such as I have shown to be the case in Naiti, may offer a better reflection of zoonotic disease contagion than do purely biomedical risk-factor approaches to disease transmission.

This chapter has analysed lay framings of livestock illness health risks through the lens of livelihoods and a gendered division of labour that has a bearing on plural interpretations of risk. Non-biological drivers of zoonoses, embedded in the daily lives of herders, shape lay understandings and management of risks, and thus must be taken into

consideration. In conclusion, this chapter supports arguments for a holistic consideration of health, recognising animals' health as part of human health within the broader "risk environment".

5. Chapter Five: Lay Experiences with Febrile Illness in Humans

5.0 Introduction

Humans and livestock live, as shown above, in a complex “risk environment” in which plural interpretations of risk emphasise the importance of living with animals and with risk, rather than seeking to reduce or eliminate sources of risk. The complexity of this risk environment extends also to healthcare. A complex interplay of individual, societal and structural factors which reflect healthcare inequalities underlie the daily lives of Naiti’s residents and affect their experiences of febrile illness. This chapter examines local people’s experiences and interpretations of fever or febrile illness, to help illustrate how it is shaped by framings and narratives of health risks and cultural understandings of health and illness.

Section 5.1 discusses fever from a medical perspective and explores the nature of, and the challenges associated with distinguishing fever, showing that, just as it is complicated for clinicians to categorise fever based on symptoms alone, lay narratives about fever among WaArusha are complex, non-linear and do sometimes draw upon both lay and biomedical modalities of diagnosis, in ways that may both overlap and contradict one another at the same time. Section 5.2 follows on from this and presents local narratives about fever, and argues that, whereas biomedical approaches may view febrile illness from a purely medical perspective, in which addressing zoonotic disease risk factors is seen to also lead to reductions in human febrile incidences, lay people perceive risk and illness in multiple and complex non-medical ways that impact upon their health-seeking behaviours, which are discussed in Chapter Six. Section 5.3 discusses lay aetiologies of febrile illness by looking at the social and cultural meanings associated with fever and the assigned labels that reflect severity, and the spectrum of available and commonly used therapies, and how all these influence people’s treatment-seeking behaviour. Section 5.4 presents converging narratives on human and animal health in Naiti and shows that, just like with animals, human health is understood and framed in broader ways reflecting the environmental, social, economic and cultural elements of health that interact at the individual, household and community levels. Finally, Section 5.5 concludes this chapter by exploring the complexity of medical plurality and hybridity in Naiti, paying attention to how local terms used to describe febrile illness are co-constructed with biomedical nomenclature, and how these influence perceptions of causality and illness prognosis. I

demonstrate that even though cultural knowledge and aetiological beliefs about febrile illness may be shared locally, there is significant variation in the emic interpretation of the severity of febrile illness, which may have implications for zoonoses control efforts in Tanzania.

5.1 A Medical Perspective on Fever

Fever refers to non-distinguishing symptoms including a rise in body temperature above the normal level, the causes of which are numerous (WHO, 2013; Crump et al., 2013; Ogoina, 2011). While there are no strict rules, a fever is generally a medical condition that is considered to be a temperature above 37.2 degrees Celsius in the morning or 37.8 degrees Celsius at other times of the day (WHO, 2013). When someone is suffering from a fever they are sometimes said to be “febrile” (ibid.). Although fever can be a sign of disease, research has shown that it plays an important role in fighting infection, because most bacteria and viruses that cause infection in people thrive best at 37 degrees Celsius and raising the body’s temperature above this helps fight them off (Crump et al., 2013; WHO, 2013). Furthermore, as most fevers are caused by viral infections, a slight fever does not necessarily need treatment (WHO, 2013).

Fevers can be classified into acute, sub-acute and chronic based on duration (CDC, 2012; Crump et al., 2013; Ogoina, 2011). Acute fevers lasting less than seven days are typical of viral infections such as upper respiratory tract infections and also cases of malaria. Sub-acute fevers may be longer than seven days but no more than 14 days and may be symptoms of zoonoses such as bovine tuberculosis, whereas chronic fevers may be associated with chronic viral infections such as HIV/AIDS, as well as some zoonotic diseases such as brucellosis (Ogoina, 2011; WHO, 2013). In other words, many zoonotic fevers can fall into any of these three categories. However, any course of acute fever can become persistent (coming and going within short spaces of time) or chronic (typically lasting longer than 14 days) if untreated (Ogoina, 2011). As I demonstrate in the next section, these categorisations of febrile illness are not dissimilar to how lay people in Naiti perceived fever and febrile illness in their households. Yet there were times when these categories were also contradictory and in which illness severity was not conceptualised as serious bodily malfunction.

5.2 Fever as Illness in Naiti

Febrile illness is a commonly occurring symptom among patients presenting at formal health facilities in northern Tanzania, and it is often associated with zoonoses such as brucellosis, Q-fever, Rift Valley fever and leptospirosis, among others (Crump et al., 2013; Halliday et al., 2015). Studies in Tanzania have shown that non-malarial febrile illness is common amongst pastoralist and agro-pastoralist communities living in the north of the country (Crump et al., 2013; Tarimo, 2016; Chipazwa et al., 2015; Seth et al., 2015). This corresponds with an emphasis on improved rapid diagnostics and treatment for malarial fever, which has led to reported declines in disease prevalence over the last two decades, although this decline has been contested (Leonard, 2007; Nakara, n.d.; Chipazwa et al., 2014). However, as Tarimo (2016) found, the focus on malaria has undermined clinicians' interpretations of non-malarial fevers and reduced the efficacy of diagnoses of non-malarial febrile illness in clinical settings in Tanzania.

Local perceptions of fever and its causes in pastoralist and agro-pastoralist settings in Tanzania remain understudied (Hertz et al., 2013). Research in this area has tended to focus on lay understandings of the biomedical disease malaria, for example the ability of mothers to recognise malarial symptoms in their children (Tarimo, 2016; Whyte et al., 2002). These studies have, not surprisingly, given the Swahili/indigenous classification of serious fever as malaria, revealed widespread recognition of malaria symptoms amongst Tanzanians, who perceive it to be the most important cause of fever and who, in many cases, use the terms “fever” and “malaria” interchangeably (see also Seth et al., 2015; Hertz et al., 2013).

In Naiti, fever or *homa* (in Swahili) is regarded both as a symptom of illness, and as an illness in itself. In its basic form, *homa* was described by respondents as a condition straddling the boundaries between sickness and wellness (see also Winch et al., 1996). As a symptom, *homa* signals the beginning of illness, existing along a continuum from less to more severe. At one end is “ordinary” fever, *homa ya kawaida* (in Swahili). This is distinguished from “serious/severe” fever, *homa kali* (in Swahili), which is associated with severe joint aches and pains, and, in some cases, diarrhoea and vomiting. At the other end of the febrile spectrum was what was described as “new/unusual” fever, *homa mpya/homa ya siku hizi* (in Swahili), the symptoms of which were often described as resembling that of “un-ending *malaria*”, that “comes today, goes tomorrow, and returns

the next day”,⁷⁸ as one man put it. In this chapter and throughout this thesis, I use the both local Maa, Swahili and English translations of these febrile categories interchangeably, and I refer back to how treatment is approached for the various conceptualisations of fever in Chapter Six.

Many people interviewed believed that colds and flu represented “ordinary” fever, which did not warrant seeking biomedical treatment. Colds and flu or *olkirobi* (in Maa), also commonly referred to as “cold/cough”, were expected to respond effectively to home-based remedies, such as the ingestion of honey mixed with herbs obtained from the forest. The expected duration for these kinds of fevers was, in the words of one patient, “no more than three to four days”.⁷⁹ This category of fever was often cited by respondents as being a normal way the body reacts to stress, a bit like a fever being a way the body fights off illness. The stresses referred to here were associated with everyday living, including bodily responses to tiredness, nutritional changes and fluctuations in local weather conditions. Likewise, Kamat’s (2006) study of mothers’ interpretation of symptoms in their febrile children in Tanzania found that care-seeking was delayed when fever was perceived to be mild and less severe. However, such fever, according to people in Kamat’s study, and supported by respondents in Naiti, could become “serious/severe” fever if left untreated, or it could also develop into “unusual/new” fever which lingered on for weeks and even months, with *malaria-like* symptoms but worse, and whose treatment could only be accomplished by a doctor trained in Western medicine. This description of unusual fever is of interest because studies in northern Tanzania have found that zoonotic brucellosis can lead to debilitating febrile illness in people, which lingers on in patients if left untreated (see Shirima and Kunda, 2016; Halliday et al., 2013; Crump et al., 2013).

The distinction between symptoms and illness is conceptualised through three broad understandings, although they vary across the social spectrum, particularly across gender. The first is that fever is a common and expected mild health problem. It is ordinary, and little or nothing should be done about it, people should just cope with it. This category of fever was perceived to be the mildest along the continuum of febrile severity. Many respondents indicated to me that this fever was easily treatable using home-based

⁷⁸ Interview, key informant, Naiti, 12 March 2017.

⁷⁹ Interview, key informant, Naiti, 9 March 2017.

therapies and did not require going to the hospital for treatment. Colds and flu are among illnesses that were associated locally with ordinary fever, and many of those with these symptoms continued carrying out their daily chores such as cultivation, herding and engaging in petty trade. The health-seeking behaviour for this illness was characterised by little or no treatment and observing symptoms over a course of three to four days, as this was the duration within which symptoms were expected to subside. If symptoms continued beyond the fourth day, participants perceived this to be serious fever, such as *oltikana* (in Maa) also locally referred to as “malaria”, *brusela* or *nang’ida* (in Maa), *nimonia* or *lemunya* (in Maa) (reference to “pneumonia”), *TB* or *kifua kikuu*, *taifodi* (local reference to “typhoid” fever), and *UTI* (sic, no local name). Used this way, fever was perceived as a symptom of a serious illness which warranted hospital treatment, especially in women and children. The third conceptualisation of fever as new and unusual was reflected in the way patients talked about the extreme severity of the illness. The concept of “new” was often expressed by respondents who believed this fever to be unusually persistent or chronic and recurring frequently in affected patients. Treatment for both severe and unusual fever was sought from different sources depending on several factors, including gender, which shaped the way severity was linked to particular health providers. For instance, women tended to associate severe fever with *malaria* and *UTIs*, while men associated it with *nimonia*, *TB* or *taifodi*. Additionally, women perceived unusual fever as resulting from within the environment, caused by a lack of indigenous diets of milk and meat, and changes in soil nutrients that weaken the efficacy of traditional medicine, whereas men believed it to be an external and special illness that was beyond the comprehension of local people, and which could only be treated by Western medicine. To these men, new fever was what Winch et al. (1996) describe as a “hospital disease”, or one that was not treatable with home-based remedies.

Treatment of these fevers, as I explain further in Chapter Six, was also gendered and was determined by the social roles of the patient (these are described in Chapter Four). For instance, whereas the vast majority of respondents used at-home treatment for severe/serious fever in adults (involving herbs, pharmaceuticals, milk and meat soup), boy herders and children were often taken to the local health dispensary or treated only with pharmaceutical drugs after consulting an “expert”, or anyone who sold drugs such as peddlers and pharmacists. This was because, as explained in Chapter Four, boy herders are crucial to herd survival as they are involved in all aspects of herding, including finding

the best pasture fields and water, and therefore severe sickness that would interfere with these chores is taken seriously (by the boys themselves and their families), and hospital treatment is perceived to be the quickest way (although not necessarily the best) to regain health. Small children are taken to the health centre for fear that their bodies are too weak and at-home treatment is not appropriate for them. Indeed, there had been cases in Naiti where children died after ingesting herbal medicines. As such, there were post-natal information posters at the clinic in the village, which targeted women with small children, emphasising hospital treatment as a first resort for any illness, advice which some mothers seemed to adhere to. This was also supported by the fact that treatment for children under five years and people over 65 years was free at the clinic, but a standard fee of 2,500 Tanzanian shillings was charged to any other patients per visit, and this fee excluded medicines, which patients had to buy separately either from the clinic (when available) or from other drug sellers. Most men that I spoke with indicated that they did not go to the dispensary for either ordinary or severe fever, but, as I will explain later, some men did go to the clinic when they perceived their fever to be “new and unusual” illness.

Although ordinary fever was to be expected and managed at home, it was the more serious fevers (severe and unusual) that were most commonly reported by many households. Up to 81 per cent of participants reported having had “serious/severe” fever in their households, and nearly half of all respondents indicated that there had been incidences of “new/unusual” fever in their households in the 12 months preceding this study. This compares to only 39 per cent of households that reported experiencing “ordinary” fever at their households over the same period. This may be because ordinary fever was believed to be so normal that many people may not have bothered to mention it at all, or it could also be the case that febrile incidences that could be categorised as “ordinary” were indeed fewer than those of more serious febrile illness.

These figures are important as they suggest, consistent with epidemiological studies in the area, that zoonoses can be a major cause of febrile illness in people in these settings (see Shirima and Kunda, 2016; Halliday et al., 2015; Halliday et al., 2012; Crump et al., 2013). Yet early detection of these zoonoses may depend on whether people believe they have “severe” or “new” fever, which are appropriate local terminologies that could lead patients in agro-pastoralist settings to prioritise hospital visits, thereby facilitating early diagnosis, treatment and complication control (see Poortaghi et al., 2015).

These local febrile categories were in no way linear or straightforward. Malaria as a category was confusing, as many people used both “malaria” and fever interchangeably, which was confusing (to me) and further complicated emic interpretation of febrile illness. Whenever people told me about malaria, they described the symptoms using terms that included fever, headache, vomiting, loss of strength and loss of appetite. Patients reported treating suspected malaria with herbal remedies (believed to have quinine and hence anti-malarial properties), and in the case of non-recovery they would either purchase anti-malarial drugs from the shop, or in some cases visit the local health dispensary for treatment (mostly women, children and herder boys visited the clinic).

At the same time, clinical records (see Table 5.1) of the febrile patients that attended the clinic during this study showed unclear and inconsistent diagnoses of non-malarial febrile illness. For example, I examined 302 febrile patient records at Naiti health clinic (those who had visited the hospital in the 12 months preceding this study), where there were only rapid diagnostic tests (mRDTs) for testing malaria and found that the diagnoses of non-malarial fever were vague and non-specific. In many of the patients’ entries, the diagnoses were of a general category such as “acute-water diarrhoea” or “upper respiratory infection”, and with a description of symptoms including “patient has fever, headache, produces wheezing sound”.⁸⁰ However, when I spoke to these patients, the majority believed that their illness had been severe fever such as malaria or the “new/unusual” febrile illness, and were therefore, not surprisingly, disappointed with their clinical results.

I interviewed a clinician who told me that he believed incidents of malaria had drastically reduced due to access to better diagnostics, using mRDTs, and noted that previously many clinicians (including himself) were quick to assign a malaria diagnosis to febrile patients because they did not have sufficient tests for the disease. He also talked about increasing awareness in the human health community in Tanzania more generally, particularly around the notion that “not all fever is malaria”, a campaign that has been promoted amongst practitioners working in livestock-keeping populations, where over-diagnosis of malaria is rife (see Crump et al., 2013). In the past, the different definitions of malaria (as a mosquito-borne infectious disease or as a violent fever) did not necessarily cause problems, as the diagnosis tended to be the same. However, in recent years, the

⁸⁰ Patient clinical records, Naiti, 12 May 2017.

introduction of new, specialised medical testing has resulted in a shift in diagnosis and, consequently, greater divergence between lay and medical definitions of disease, particularly non-malarial febrile illness.

Yet, despite these diagnostic advancements and the corresponding presumed decline in the prevalence of malaria in Tanzania, some studies in other areas in Tanzania have found that febrile patients who present at healthcare centres continue to be misdiagnosed as having malaria (see Tarimo, 2016; Crump et al., 2013). In cases where malaria is ruled out, Seth et al. (2015: 2–3) found that clinicians faced challenges as they lacked “sufficient means to specifically reach etiologic diagnosis of [non-malaria] febrile conditions”. This, coupled with local definitions of fever, created problems for clinicians. As the clinician in Naiti also stated, healthcare workers face dilemmas in regard to diagnosing non-malarial fever:

Author: Everyone talks about malaria in the village. When patients come here, and you do not find malaria, how do you diagnose other non-malaria febrile illness?

Clinician: I do not have diagnostic equipment here, so it is difficult to make a correct diagnosis if the patient does not have malaria because we only have malaria diagnostic tests here. I mainly base my diagnosis on the history of the patient: what is their profile, their age, what activities they are involved in, how the symptoms are presenting and the patient’s other medical history. This helps me to make a presumptive diagnosis and prescription. But if the symptoms persist, I normally refer them to a hospital where they can be tested, but a majority do not normally go because it is expensive.

Author: What do patients think they are suffering from? Do they usually accept your presumptive diagnoses?

Clinician: Well, normally when a patient comes here, they have already tried everything else, antimalarials, herbal treatments, prayer etc., so they come when it is late, and they tell me they have malaria. When I test and find there is no malaria, they ask if it is typhoid, or increasingly, urinary tract infections. But I cannot tell them for sure because I cannot confirm these diseases, so I give them general advice. It is easier to say you have a respiratory infection or send them for testing in a hospital in the town.

This conversation with the clinician in Naiti shows how patients, upon being told that they do not have malaria, continue to seek confirmation that their classification of symptoms as serious fever (or in their view malaria) is an appropriate diagnosis, asking

if it is perhaps typhoid or other familiar diseases associated with serious fever or *homa kali*. Patients, particularly women, expect to be diagnosed with malaria at the clinic and to be prescribed antimalarial drugs when they perceive their febrile symptoms to constitute “severe/serious fever”. Men generally did not visit the clinic when they thought they had malaria (they self-treated with herbal therapies mixed with fresh, unboiled milk, as boiling was commonly perceived to interfere with its medicinal qualities) but went to the clinic if they interpreted their severe febrile symptoms as pneumonia or tuberculosis, and they expected to be prescribed antibiotics.

In common with the findings of Chandler et al. (2008), respondents in Naiti explained that they would be disappointed if the hospital diagnosis was contrary to what they expected, and that they would opt to consult another healthcare provider or obtain the preferred drugs privately. The clinician in Naiti stated that patient pressure undermined his ability to provide services to patients, as they presented late after using at-home treatments which compromised the prognosis of illness. He added that:

When I tell a patient that they do not have malaria or pneumonia, they do not believe it and they want antimalarials or antibiotic drugs. If I say no you cannot have these, they will still buy the drugs from the sellers and ingest them.⁸¹

This statement also shows the clinician’s reluctance to be drawn into a diagnosis and the resulting impasse as the two definitions of disease/illness cannot be aligned. Ironically, however, as I show below, it is not the lack of a diagnosis, nor the diagnosis of malaria or other serious fever, both of which people have ways of dealing with, that are likely to persuade Naiti’s residents to undertake a visit to the hospital. Rather it is the diagnosis of new fever, which is ambiguous and difficult to deal with. This contrasts with evidence that suggests patients are particularly concerned to secure drugs to effect treatment. In Ghana, for example, Jephcott (2013) found that clinicians chose a diagnosis which had provisions for drugs associated with it because of expectations of treatment and availability of the drugs. Chandler et al.’s (2008) study in Tanzania also found that clinicians often arrived at a diagnosis that was most likely to be “accepted” by their patients.

This concept of “acceptability” was reflected in clinicians’ training, having occurred in a

⁸¹ Interview with the local clinician at Naiti health dispensary, 4 June 2017.

context where the importance of malaria was strongly promoted. Chandler et al. (2008) also argued that the influence of peers and expectations from colleagues put pressure on health workers to conform to perceived patient preferences, and this led them to primarily consider malaria diagnoses. This was especially due to shared perceptions that malaria was easier to diagnose than alternative diseases, was a more “acceptable” and conventional diagnosis, and that missing malaria was inexcusable.

Furthermore, studies in northern Tanzania show that when clinicians rule out malaria in febrile patients, the most common diagnoses are based on symptoms alone, and these commonly include upper respiratory infections, UTIs and diarrhoeal diseases. For example, in Seth et al.’s (2015) hospital-based study of causes of febrile illness in children in Tanzania, they found that multiple aetiologies of febrile illness were recorded. Among these were respiratory infections, occurring in more than 60 per cent of cases; UTIs and diarrhoeal diseases occurred in 21 per cent and 18 per cent of the cases, respectively. Similarly, in my study, upper respiratory infections and diarrhoeal disease were the most commonly recorded diagnoses among all febrile patients over a 12-month period preceding the study, occurring at 35 per cent and 36 per cent, respectively (see Table 5.1).

Treatment for these illnesses involved antibiotics, mainly penicillin and amoxicillin, both of which were locally believed to be effective in treating severe fevers. Even without a prescription, patients and their carers bought and shared what they believed to be these antibiotics from kiosks and from unlicensed sellers, although the medicines were not always labelled. I observed many occasions where lay *doktas* (doctors) prescribed biomedical drugs. As suggested above, biomedical diagnoses do not always fit with patients’ own understanding of illness, with the lack of diagnostic technology allowing for greater convergence between biomedical and indigenous definitions. For instance, I regularly heard the clinician in Naiti clinic encourage patients to consume milk for its “therapeutic properties”. Many people also believed that milk was therapeutic precisely because of its capacity to trigger diarrhoea and thus rid the body of germs, intestinal worms and other disease forms (see also Carruth, 2014). The association of milk with therapeutic value, as I will elaborate on in Chapter Seven, is not unprecedented, as there are long-running biomedical debates on the role of milk-based diets in curbing malaria among children in livestock-keeping communities. For example, previous studies such as those of Murray et al. (1978), and more recently Matz et al. (2019) found that outbreaks of *plasmodium falciparum* malaria did not usually affect nomad children consuming a

predominantly milk, as milk is associated with inhibiting rapid division of the plasmodium parasite that cause malaria.

Table 5.1 below shows the variety of medicines that were prescribed by the clinician for the various febrile diseases recorded in patient records that I reviewed.

Table 5.1: Clinical Records for 176 Febrile Patients in Naiti Health Centre.

Disease	No. of Patients in Past 12 Months	Patients' Mean Age	Patient's Gender Female (F)/ Male (M)	Prescription
Upper Respiratory Infections	117	14	F = 20 M = 97	Amoxicillin antibiotic 2 x 4 a day, milk
Acute Water Diarrhoea	126	13	F = 72 M = 51	Flagyl (dose)
Non-Severe Pneumonia	49	46	F = 20 M = 29	Amoxicillin antibiotic (2x3), milk
Flu	8	9	F = 4 M = 4	Paracetamol
Malaria	2	66	F = 2 M = 0	Antimalarial

Diagnosis of febrile illness based on symptoms alone raises important questions regarding non-malarial febrile illness. A recent study from Kenya found that while clinicians exhibited strong familiarity with diagnosing malaria, they lacked resources such as diagnostic testing, necessary medications, and training modalities in assessing and treating non-malarial febrile illness (Hooft et al., 2017). The authors observe that these limitations led to inconsistent management of febrile illness by healthcare providers, and increased the prescription of unnecessary antibiotics, thereby leading to antibiotic resistance in patients. Chipwaza et al. (2015) also found that, in Tanzania, presumptive treatment of febrile patients led to antimicrobial resistance and poor health outcomes in those patients studied.

Nonetheless, as shown in the following section, the aetiology of febrile illness in medically underserved communities like Naiti is negotiated and co-constructed, with lay people themselves contributing knowledge and understanding.

5.3 Lay Aetiologies/Causes of Febrile Illness in Naiti

Naiti residents' emic taxonomy of commonly held illness labels and their symptoms (see Table 5.2) contrasts with biomedical categorisations of disease that I discussed earlier.

Many of the lay labels and symptoms for a variety of febrile illnesses reflect some form of hybridity or co-construction with biomedical labelling. The five most common labels that are assigned to fever are: *oltikana* (in Maa) also locally referred to as “malaria”, *olkirobi* (in Maa), also commonly referred to as “cold/cough”, *brusela* or *nang’ida* (in Maa), *nimonia* or *lemunya* (in Maa) (reference to “pneumonia”), *taifodi* (local reference to “typhoid” fever), and *UTI* (sic, local reference), which did not have a local Maa or Swahili equivalent. As Table 5.2 illustrates, most of the symptoms associated with these illnesses were consistent with the clinical symptoms of their biomedical equivalents. Respondents described malaria as presenting with symptoms such as fever and headache, both of which are also commonly used in malaria diagnoses (WHO, 2010). Similarly, “cold/cough” was frequently accompanied by a runny nose, wheezing and coughing. *Brusela* was characterised by joint pain, headache, nausea and sweating. *Taifodi* fever was associated with dizziness, nausea, headache, joint pains and chills.

Table 5.2: Taxonomy of Emic Febrile Illness Labels.

Local Name	Olkirobi/ Homa ya Kawaida	Oltikana/ Malaria	Taifodi	UTI	Lemunya/ Nimonia/ Oloodo	Nang’ida/Brusela/Homa Ya Maziwa/Malaria Mpya
Lay category	Ordinary fever	Serious/violent fever	Serious/violent fever	Serious/violent fever	Serious/violent fever	New/unusual fever
Approx. English translation	Flu/cold	Malaria	Typhoid fever	Urinary tract infection	Pneumonia	Brucellosis
Lay symptoms	Fever, headache, coughing, sore throat, weak body	Fever, vomiting chills, sweating, joint pain, loss of appetite	Fever, stomach ache, Diarrhoea, loss of appetite, headache	Fever, child cries continuously, cannot pass urine	Fever, breathing difficulty, chest pain/ compression	Fever, chills, sweating, loss of appetite, joint pain, “just like malaria that is never ending... comes today, goes tomorrow, returns the next day”
Biomedical symptoms (CDC)*	Fever, chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches and fatigue	Fever, chills, sweats, headaches nausea and vomiting, body aches, general malaise	Sustained fever (39° to 40° C), body feels weak, stomach pains, headache, loss of appetite	Fever (38° C or above), change in urine smell or colour, vomiting, loss of appetite	Cough, fever, difficulty breathing	Fever, sweats, malaise, anorexia, headache, pain in muscles, joint and/or back fatigue. Symptoms may persist for longer periods of time, others may never go away or recur

Although the lay labels and illness aetiologies presented in this table are approximated with biomedically-defined diseases, as I explained earlier in Chapter Four, caution must be taken not to map or equate local diagnoses and terminology to established biomedical diseases, in the way for example Queenan et al. (2017) do. This would risk taking away the emic interpretation of ill-health, which as I explained earlier, is not always about bodily malfunction in the biomedical sense, but can also be a consequence of broken

social relationships as I illustrate in Chapter Six.

In Naiti, the process of diagnosis and of labelling fever somewhat converged, to a certain degree, with the biomedical aetiology of febrile illness described at the beginning of this chapter. Yet these lay processes were also far from linear and arriving at a label involved complex interactions and negotiations between and within the families of patients. Illness was classified based on a combination of factors including social factors of gender, age and social standing, the perceived cause of illness, the affected part or parts of the body, and how the illness manifested.

Aetiologies of febrile illness were even more complex and too inconsistent for me to characterise them. For example, while experts associate mosquito bites with causing malaria (WHO, 2013; Ogoina, 2011), drinking dirty water with typhoid (WHO, 2013), consumption or inhalation of unboiled or uncooked milk as a cause of brucellosis (CDC, 2012), emic perceptions of causes of febrile illness consisted of a mix of local and external factors. Local associations were made with the environment and nature, such as wind and air (the concept of cold) being associated with causing “pneumonia”, while “malaria”, as indicated above, was perceived (especially by women) to be a result of malnutrition, particularly a lack of livestock products in the daily diet, as well as of cold or sudden changes in temperature (both a fall or rise). The causes of *UTI* and *brusela* were unknown and, as shown in Chapter Four, the biomedical explanations of approximate diseases i.e., brucellosis and urinary tract infection (UTI) were rejected by many of the participants in this study.

Some patients told me that they went to hospital due to recurring febrile illness and were diagnosed with “brucellosis”, and although these cases were few and far between, this could be taken as confirming that this is indeed a new form of fever that requires specialised treatment at the hospital, and certain clinics in Tanzania are now focusing on distinguishing between malaria and brucellosis. Perhaps it also shows that zoonoses are becoming a more commonly identified febrile illness (see Crump et al., 2013; Mangesho et al., 2017). This also, ironically, confirms Naiti residents’ indigenous categorisation of *brusela* as a form of “new/recent” fever, *homa ya siku hizi*, as something unusual, ambiguous and which cannot be treated through conventional means. But it also challenges dominant perceptions about local people being ignorant or unaware of these diseases, therefore justifying the need for experts to go in and inform people about them,

when perhaps what is needed is understanding of the ways in which lay people categorise and label ill health, and working with them to find solutions to these health challenges (see Wilkinson, 2013, in regards to West Africa).

As discussed at the beginning of this chapter, and as illustrated in Table 5.2, biomedical approaches to febrile illness also fit into the three primary local categories of fever, namely ordinary fever, severe fever and unusual fever, and considerations of these gradations of fever are important in the process of diagnosis and labelling of illness for WaArusha patients.

Knowing when a fever might move between the three categories of ordinary, severe and unusual is not always clear-cut, and often involves careful consideration of the symptoms. A febrile patient described the distinction between “ordinary” and “severe” fever; she believed she had suffered *malaria* because:

It was not like the ordinary fever. I was not having a runny nose or a sore throat; I was experiencing weakness in my body and felt dizzy. I began vomiting soon after and that is when I knew I had *malaria* fever and not ordinary fever.⁸²

A male respondent added:

Taifodi is severe fever because it affects the whole body, the gut, the head and it sucks out all of your strength. If I were to choose, I would prefer ordinary fever to severe fever, because with ordinary fever you feel bad in the throat and cough for a few days, but it does not affect your strength; you continue with your functions and chores. But severe fever and new fever weaken you and they stop you from performing your everyday duties. Unfortunately, these fevers are very common in the village these days, everyone complains of it.⁸³

Although these febrile labels were commonly shared among participants (i.e. the perceptions of symptoms of ordinary fever and other, more serious fevers), there were examples of emic diversity in perceptions of severity, particularly between what was perceived as “malaria” fever and the “new/unusual” fever. For example, warriors in a focus group discussion agreed that:

With *malaria* fever, the body feels hot in the day and very chilly with

⁸² Interview with female febrile patient, Naiti, 19 July 2017.

⁸³ Interview with male febrile patient, Naiti, 14 May 2017.

shivering in the night. You have no strength and you may vomit or feel nauseous. If you treat it (you can use herbs or anti-*malaria* tablets if you can afford them), *malaria* only lasts for a few days, maybe a week, and you start experiencing healing afterwards. If you take Western medicine, the sickness takes a shorter time, but it is more violent because you feel sick a lot. However, with the unusual fever, it can go on and on. It comes and goes... It can last for many months and only the doctor with Western medicine can treat it.⁸⁴

As mentioned earlier, many female respondents did not view *unusual* fever as a special illness that needed Western medicine. Instead, they attributed it to compromised bodily “strength” (described as the body’s ability to withstand illness), which was a result of diminishing indigenous foods and weakened strength in indigenous therapies, in turn a consequence of climatic changes and low soil nutrient. One woman argued that:

Malaria is a serious fever that is very common here. Some people say it is new, but I think it is the same illness, just new symptoms. You have to think about our bodies. They are changing so the way they receive *malaria* is different. We are weaker than we used to be because we do not get enough nutrients; milk is scarce, and our ancestral diet of milk, ghee, meat and blood is no longer available, so you get *malaria* and your body cannot deal with it. The medicines that used to be effective are no longer able to treat *malaria*, because the soils have become bad, and they produce herbs that are weakened in strength. It is not *malaria* that has changed; it is our bodies that cannot fight it efficiently as they used to.⁸⁵

These gendered perceptions of febrile illness link to the discussion of gender roles and human-animal interaction in Chapter Four. Women see “new” illness as part of broader social, economic and environmental changes that affect indigenous ways of life, such as diminishing forests where food and medicine are foraged, and lack of or reduced animal-source foods, which compromise people’s health as body “strength” is weakened due insufficient nutrients. Again, this association of milk-based diets with healing properties is not far-fetched but a subject of on-going biomedical debates (see Murray et al., 1978; Matz et al. 2019). Men, however, see these illnesses as special, requiring hospital treatment, perhaps because, as a group, men in Naiti do not usually deal with health and food security in the household, and therefore they are less likely to notice diminishing

⁸⁴ Focus group discussion with warriors, Naiti, 14 May 2017.

⁸⁵ Interview, key informant, Naiti, 14 May 2017.

resources such as forests where medicines are foraged, or compromised soil nutrients when harvests are poor. Women are the growers of food crops on family plots and they are therefore the first to notice when soil nutrients are affected. And as carers of their households, women also notice when family members fall ill due to undernutrition or lack of specific indigenous diets, as one female respondent reflected in an earlier quotation, that the lack of available milk in her household meant family members fell ill. Perhaps this also shows that in order to understand how different people perceive the severity of febrile illness it is necessary to look at the way they link symptoms of illness to livelihoods more broadly, including to environment, agriculture and livestock, as these inform their perceptions and their health-seeking behaviours.

A growing body of literature focusses on traditional healers' knowledge and perceptions of febrile illness and how they approach healing in medically-underserved communities such as in Naiti, where such knowledge can be crucial in designing inclusive and culturally congruent approaches to the management of fever, including zoonotic fevers (see Marsland, 2007; Gessler et al., 1995). In Naiti, a local medicine man explained *malaria* as:

Someone with *malaria* is someone with a rough gut where the *malaria* sits. That is why the patient gets headache, stomach ache and pain in the joints. The head is connected to the stomach, where *nyongo* [bile] sits. *Malaria* runs through the body and if they take medicine but do not vomit the gut out, they will take a long time to heal. The sick gut must come out first, then the person gets well. Western medicine does not make the patient vomit the gut out, but our traditional medicine does, so it is better you take traditional medicine and milk first.⁸⁶

This traditional healer's comments reflect the medical plurality and co-construction of disease (discussed in Chapter Two and above). They show how biomedical knowledge is interwoven with lay people's traditional knowledge and experiences. In both WaArusha and biomedical diagnostic techniques, an important aspect of fever and its categorisation is the consideration of the patient's body temperature.

Among participants in Naiti, variation in body temperature was expressed in terms of severity, which shaped responses to episodes of fever. A patient with fever was often described as having a body warmer/hotter than normal, and the binary of "hot or cold",

⁸⁶ Key informant interview with male traditional healer, Naiti, 29 March 2017.

with shivers, chills and sweating, was explicit in febrile patient narratives. Respondents also recognised the chronic potential of fever, believing that “ordinary” fever, if left untreated, could lead to *malaria* and other illnesses. Some described “unusual” fever as a symptom of *brusela* (also known as “milk fever”). “Milk fever”, as its name suggests, was so named because government and other official actors associated brucellosis with consumption of uncooked milk. However, and although some participants used this terminology, many rejected the idea, as I illustrated in Chapter Four. For example, recalling his encounter with “milk fever”, a male livestock-keeper in his 40s narrated his experience as follows:

I experienced “malaria-like” symptoms and when I went to the dispensary in Naiti, the clinician suggested I go for a blood test. I had been treated here two weeks before with anti-malaria medicine, but although I had felt better for a while, the sickness kept returning. I thought it was an unusual fever and I knew about *brusela* [brucellosis] from a friend who lives in Arusha. He told me *brusela* is a sickness for cows, but it can also affect people if they drink a sick cow’s milk without cooking it first. I knew perhaps my *malaria* was actually *brusela* because sometimes I drank milk without asking my wives to boil it first. Sometimes there is no means to cook the milk, like with firewood... so I was feeling fever, chills, I was unable to eat, and was sweating profusely all the time. I also felt weak, and I had recurring severe fever. When I was tested in Arusha, the doctor said I had the disease [brucellosis]. However, I am not very sure that it is the milk that gave me this sickness.⁸⁷

Although this livestock-keeper accepted the association between milk and brucellosis, he remained sceptical about the zoonotic origin of his own illness. Like many, he did not believe that a cow’s sickness could be transferred through milk, not least because of beliefs in milk’s healing qualities. Instead, both he and others associated “milk fever” with environmental and ecological factors, including changes in temperature (too hot or too cold), wind (hot and wet seasons), rainfall and vector ecology. These changing factors were bringing new and unusual fevers to Naiti, fevers which were ambiguous, with difficult-to-understand causes, and therefore challenging to treat. A male respondent described the dynamic interaction between severe febrile illness and the changes in what he perceived as environmental causes of illness as:

⁸⁷ Interview with male herder, Naiti, 9 July 2017.

It [fever] used to be manageable with traditional remedies, but these days the mosquitos are different and carry more lethal *malaria* fever that does not easily respond to our local therapies. Many people get this “new malaria” that does not go away easily. It is endless, and it keeps coming back no matter what you do to treat it.⁸⁸

Emic understanding and perceptions of this new “endless fever” and/or perhaps brucellosis provide important clues to the rising awareness of zoonoses in this community and represent important knowledge of zoonoses that could have implications in local control efforts for zoonotic diseases, particularly in contexts where people are unlikely to associate fever in humans with livestock illness (see Hertz et al., 2013). As I pointed out earlier in this chapter, some of the implications could be that if people need to go to hospital, they should be told that they have new, unusual fever, and not malaria or typhoid, and especially not a non-diagnosis, as this leaves it up to them to make the decision about whether it is ordinary, severe or unusual. Perhaps it is this change in the language of diagnoses at health facilities that holds the key to potential early detection and treatment of zoonotic disease in places like Naiti.

Lay views about illness aetiologies were not, however, exclusively based on indigenous cultural beliefs. Rather they were influenced and shaped by concurrent demands for diagnostic technologies and by beliefs in Western biomedicine as a superior cure for febrile illness (see also Carruth, 2014). As illustrated throughout this chapter, febrile illness labels were co-constructed and represented hybrids of both local and biomedical terminology. Respondents evaluated the local dispensary in Naiti as lacking Western technology and therefore not “good enough” for its users and not “good enough” to make diagnoses. A widow in her 60s noted that:

I think my husband would not have died if the dispensary had proper medicine to cure his illness. They [staff at the dispensary] do not have anything there; no computer, no machines and no testing rooms [laboratories]. Without machines the clinic is no good because the doctor cannot know what you are suffering from. He only gives you what he thinks is good for you, but he is not sure about it.⁸⁹

Another respondent added that:

⁸⁸ Interview, Naiti, 7 May 2017.

⁸⁹ Interview, Naiti, 17 March 2017.

We do not go to the dispensary because it is a waste of time and money. I would rather ask my family to tell me what the illness is because they know me very well but the doctor in the clinic does not have the machine to tell him the illness. He asks you to tell him everything and then he tells you it is one thing or the other. I do not trust that, I would accept his diagnosis if he used the Western machines.⁹⁰

Thus, emic perceptions of febrile illness are complex and far from linear or neat. As these comments illustrate, Naiti's residents are only too aware of the limitations of biomedicine when not accompanied by a combination of financial resources, technology and expertise. Consequently, they often drew upon biomedical modalities of diagnosis in ways that were both overlapping and contradictory at the same time. For example, while many participants distrusted pharmaceutical drugs and preferred traditional remedies to treat fever, they trusted new technology to lead to better diagnosis and therefore more accurate prescription of pharmaceutical drugs. Therefore, the problem, from their point of view, was not with the medication; rather they had problems with inaccurate diagnoses that also led to prescribing therapies that were ineffective.

Even though cultural knowledge and aetiological beliefs about febrile illness may have been shared locally, people interpreted the severity of illness differently, and this informed the subsequent treatment pathways (examined further in Chapter Six) that were sought in dealing with actual episodes of illness within the household. The key factors which influenced this variation in emic understanding can be explained through reference to the social construction or framings of febrile illness, the human/animal health nexus, and medical pluralism and hybrid health systems.

Gender and Social Construction of Febrile Illness

As I discussed in Chapter Two, lay framings of illness often draw from social and cultural ideas about what it means to be healthy, rather than on biological or medical understandings of the body (Good, 1994; Kleinman, 1981; 1988). Lay people's understanding of health may include collective experiences of health and illness, as Strang and Mixer (2015) found to be the case in their study of lay beliefs about sickness and well-being among the Maasai in southern Kenya. Similarly, in Naiti, and as illustrated above, lay framings of febrile illness stemmed from and were influenced by a mix of cultural beliefs, the environment, and social and gender differentiation. In other words,

⁹⁰ Interview with male patient, Naiti, 8 June 2017.

interpretation of symptoms depended on whether the respondent was male or female, as well as other factors such as age, marriage, social status and religious beliefs.

In addition, while relatively wealthier households used biomedical means to treat serious febrile illness, especially when patients were boy herders, pregnant women or children, poorer households were wholly dependent on locally available therapeutic measures. Furthermore, households headed by younger people were more likely to interpret fever as a symptom of serious illness and therefore seek treatment more promptly than those headed by older people (as in the example of a 40-year-old's experiences with brucellosis, explained above). This was because these young people (both male and female) were more exposed to towns and cities where they frequently went to trade or work, and to hospitals, particularly younger men, who often associated going to hospital with ideas about being "modern". Boy herders also visited the clinic when they fell ill because parents perceived hospital treatment as leading to faster recuperation (although not necessarily better), so the boys could go back to their herding chores as soon as they started feeling better.

Men generally underestimated febrile illness and only sought treatment when their symptoms were acute (in many cases when they became too ill to leave the house), while women generally sought treatment earlier (whether this was traditional or biomedical). The seriousness with which men and women took febrile illness also affected the way they mobilised family resources to pursue treatment, and the social roles and expectations of a patient by his or her family. Contrast, for example, these first two quotations from men with the subsequent statements by women:

Men's Comments:

Homa is not a sickness. It is ordinary, it comes to everyone every once in a while. You can live with [ordinary] fever [*homa ya kawaida*]. It is the way of life.⁹¹

Homa is not a disease if you are breathing normally and you are not losing your senses with it. Sometimes it can be *severe* fever, such as typhoid, or tuberculosis, but you will know this if the patient coughs blood. But *homa ya kawaida*? where you feel some headache and nausea, it could just be malaria, it is something that comes every now and again to remind us that we are

⁹¹ Focus group discussion, male respondent, Naiti, 7 February 2017.

human. A human being must be reminded frequently that they are not immortal, that they could be ill. Fever does the reminding.⁹²

Women's Comments:

I started feeling bad in my throat and the pain went into my stomach. It was *homa kali*, my body just got hot. I was not shivering or anything like that, so we knew it was not malaria. I had diarrhoea all night and I thought I was dying... it was not a normal illness. I kept having the fever; it comes today, goes tomorrow, and returns the next day.⁹³

I had fever and I was shivering like someone with *malaria*, but the body did not get hot at all. I used some home treatment and also took paracetamol, but I did not feel better. The fever became so bad and it became *malaria*, I wanted to go to the clinic, but my family said I did not need to because it was only *malaria* and it could be treated at home, so I did not go.⁹⁴

I suffered from fever from time to time. It is not a serious illness and you do not need to go to hospital for it, but it makes you weak and you are not able to do your work. Two days ago, I could not leave the house because of fever. I did not feed or take my goats to water at all. I did not have money for paracetamol, so I sent my son to bring medicine from the forest.⁹⁵

These statements show that contrasting narratives regarding the severity of febrile illness between men and women can influence who goes to hospital and for what reason. They also provide useful clues for targeting certain groups of people with specific messages about health issues. Male patients, for example, could be more inclined to visit a health facility more promptly when their diagnosis is given as unusual fever rather than typhoid or pneumonia, malaria or non-diagnosis, whereas women may seek this type of healthcare when they believe their symptoms are not those of ordinary fever. These strategies may be simple, yet they could be more effective, as they resonate with people's illness aetiologies, and so they are more likely to yield results than generic public health messages.

Additionally, women in monogamous marriages seemed to get prompter support from their husbands to seek medical help early, whether buying medication from the local kiosk or visiting a local dispensary. In contrast, women in polygamous marriages were more

⁹² Focus group discussion, male respondent, Naiti, 7 February 2017.

⁹³ Interview with female respondent, Naiti, 12 February 2017.

⁹⁴ Interview with female respondent, Naiti, 20 May 2017.

⁹⁵ Focus group discussion with women, Naiti, 9 February 2017.

likely to delay treatment because it took more time for them to access support from their husbands. However, older women (over 60) with adult children, regardless of whether they were in a monogamous or polygamous marriage or married at all, received prompt support from their grown children (in the form of money to buy medicine, advice on what action to take when ill and prompts to their fathers for support). Sons and daughters-in-law also gave support to their parents and in-laws with respect to healthcare in the form of advice, hospital fees and supplying medication. Small children were more likely to be taken to a health facility than adults because of the belief that children were too young to handle the harshness of unprocessed herbs.

Furthermore, people with smaller family sizes (see Chapter Four) were more likely to prioritise fever as a serious illness, perhaps because of having only one spouse and therefore fewer family members to consult, as opposed to larger families having multiple spouses where lines of consultation can be quite long. For example, a father of two who was married to only one wife worried about her fever and responded to my question “How is your family?” with “My wife has severe fever, I can’t think. I have to get her medication as soon as possible”.⁹⁶ In contrast, a woman who was the second wife in a large family appeared unbothered about febrile illness experienced by members of her family. When I asked her about her family, she replied “Everyone is fine. There are a few *ordinary* fevers here and there, but nothing serious”.⁹⁷ I later discovered that her husband was being treated for suspected pneumonia.

Religious beliefs also played a role in narratives of febrile illness in Naiti. New and emerging Pentecostal churches (there was one in the village) eschewed traditional herbal remedies and emphasised prayer as a form of healing. Although only a few people subscribed to these beliefs, they were influencing the way local healers practiced in the community. These healers were not, in general, open about their practices and often declined to be interviewed about them. In one of the few interviews that I had with a local traditional healer, he expressed anxieties about how the new church was influencing views of his healing modalities. He explained that:

The new church is manipulating people away from traditional medicine by claiming that prayer is a superior mechanism in healing. But they are wrong

⁹⁶ Interview, Naiti, 28 February 2017.

⁹⁷ Interview, Naiti, 28 February 2017.

because traditional medicine does not oppose God. It operates in tandem with beliefs about supernatural healing, and where, as a healer, I have little control. I think in a few years' time, we will not be able to practice because many people may join the churches and become anti-traditional healing, and this worries me.⁹⁸

These social factors are useful in understanding determinants of health and ill health, because as Rushton et al. (2012) also observe, these social dynamics can dictate how a disease enters a society, how it spreads and how it is controlled. These factors also, however, have implications for understanding zoonoses control and management. Appreciating these broader determinants of health in lay populations is necessary in order to develop effective interventions that can accommodate people's behaviour, so as to improve risk management, particularly in low-resource settings.

5.4 Converging Narratives of Human and Animal Health

Human and animal health beliefs and understandings are embedded and reflected in complex ways of everyday life in Naiti. A significant majority of participants used the same modalities to interpret symptoms and assign labels to febrile illness in both people and livestock. Illnesses that were feared in animals, such as anthrax, were also feared in people, as symptoms in both were understood. However, the majority of livestock illnesses, detailed in Chapter Four, were commonly seen as separate from human health and “manageable” by respondents. This separation in causality does not, however, mean that animal and human illness fell into separate categories. Rather, just as participants approached “ordinary” fever (discussed above), so they perceived livestock illness as something to live with and manage as part of everyday life. In other words, herders downplayed the effects of those livestock illnesses that they believed did not lead to mortality. As such, when morbidity did not lead to mortality in animals, herders understood this as a “low risk” illness to themselves.

Consequently, people refrained from ingesting milk or specific pieces of meat (intestines and offal) from animals with symptoms of illness perceived to be severe (that is, when they believed that an animal's death was imminent, as in anthrax), but reported consuming these products when symptoms were perceived to be “ordinary” fever,

⁹⁸ Interview with male traditional healer, Naiti, 11 May 2017.

including from goats with febrile symptoms, as in a case of suspected *ormilo*, discussed in Chapter Four.

Both human and animal patients are cared for collectively by healthy household members. For example, and as I described in Chapter Four, young sick animals are cared for, and nursed back to health, in the same hut where sick people live. An assigned carer (often an older female in the family) nurses both animals and humans to recovery. Sometimes medicines (both traditional and pharmaceuticals) are shared between sick people and animals, particularly where illness symptoms are perceived to be similar (for example involving body swelling); other times they are not.

These collective approaches to health and ill health that spanned the human and animal lifeworlds were reflected in social interactions between members of the community. For instance, whenever people met while out and about in the village, an elaborate exchange of greetings reflected this holistic view of health. It would often follow a sequence involving people taking turns to enquire about the welfare of family, then livestock, land (grazing fields, forests and farmland) and rain. Exchanges included: “How is your home? Are your people and livestock well? Has it rained? How is the land?” This suggests that, in keeping with the example of animal and human nursing, the human-animal lifeworlds were embedded within and co-constructed from each other.

Similarly, Strang and Mixer (2015) discuss how the Maasai in southern Kenya approached illness, care and healing, noting that care for the ill was influenced by and embedded in the social structures of kinship, religious beliefs, livestock and the environment. Thus, when asked, “How are you?”, one response in Strang and Mixer’s research was, “We are not well, my wife’s mother is sick” (2015: 4). In Naiti, a respondent told me “we have sickness in the family; my son’s cows are sick”.⁹⁹ Such collective experiences of health challenge both the biomedical and health systems’ focus on the individual and on the risk-factor approach to infections, while offering a different perspective on zoonotic disease contagion.

In some cases, whilst I was interacting with participants in Naiti, concern for animal health was perhaps more widespread than concern for people’s health. During focus group discussions on human health, people often steered the conversations towards

⁹⁹ Interview, Naiti, 12 May 2017.

animal health; for example, a participant interrupted a discussion on febrile illness in his family with:

We are more troubled with sickness that kills our animals like *ormilo* than human fevers. For people, you know what the illness is, and you can treat it, but we have no treatment for *ormilo* and this is what bothers us more than our own illness that you asked me to talk about. So, maybe you should help us find a cure for *ormilo* and then you can ask us about our illnesses.¹⁰⁰

This comment refers to the risk trade-offs (Ladbury et.al., 2017, discussed in chapters Two and Four) that people choose to make and their deep concern with the health of their livestock. Because livestock provide a means to livelihoods, medicine, food and savings, and have cultural uses, animal illness poses a significant threat not just to food security, but also to human health and the social fabric that holds the community together. As a result, treating animals is understandably a priority and a trade-off that people make when faced with limited choices between treating illness in people and in their livestock.

Therefore, there is a need to recognise economic incentives and the local environment (interaction between people and livestock), as well as social, cultural and psychological factors at both the individual (including physical attributes such as gender and age) and group levels (including consideration of family and social networks, cultural practices), as well as economic or material constraints that determine what actions people take to limit and manage risks. As Rushton et al. (2012) also note, when thinking about interventions, the impact of zoonotic diseases and their control, risk management in livestock requires people-centred approaches. Embracing such approaches can lead to the formulation of more effective interventions by better accommodating and reflecting the behaviour, values and realities of their intended beneficiaries.

5.5 Conclusion

Lay experiences of febrile illness in Naiti are shaped by hybrid and plural understandings of animals and zoonotic risks. On one hand, febrile illness is associated with ecological factors, livestock and vector interaction (rain or cold causes malaria; infected intestines and offal, and, as some people believed, milk, cause illness in people, as in anthrax), but on the other, illness is also associated with divine causes, and febrile illness in particular is perceived as normal and an expected part of life. Therefore, understanding these

¹⁰⁰ Focus group discussion with warrior men, Naiti, 17 May 2017.

dynamics is essential in designing zoonotic disease control strategies that are culturally appropriate and reflective of the lived realities of agro-pastoralists.

At the same time, health beliefs in Naiti demonstrate the benefits of working at the human-animal interface in responding to zoonotic diseases and particularly for understanding plural causes of human febrile illness. Animal and human health in Naiti are co-constructed, with people seeing a degree of congruence between animal and human experience. Consequently, animals and humans, it is believed, experience similar diseases with different names, such as *oloirobi/olkirobi*, which means “cold” in the Maa language, and which was used to describe colds/flu in people and “foot-and-mouth” (approximate terminology) disease in animals. But animals and humans were also believed to experience different diseases with similar names, such as in the case of *olitikana*, which are both associated with “malaria” in humans and “East Coast fever” in animals respectively. Moreover, people believed that having “ordinary fever” and being ill was normal, just like it was normal to have ill animals. Illness in animals was not perceived to be a problem for humans unless it led to mortality (such as anthrax), in the same way as “ordinary fever” was not considered to be a problem in humans.

The WHO’s (2012a) call for increased surveillance of zoonotic outbreaks in poor settings needs to integrate the social and cultural determinants of ill health in people and animals, especially in communities where livestock are part of everyday life, as in Naiti. Local perceptions of zoonotic risk factors differed from, or in some cases were co-constructed with, expert understandings, and this has implications for effective intervention strategies that seek to control zoonoses in such settings. As noted above, people’s behaviour and socio-cultural perspectives about health and illness dictate how a disease enters a society, how it spreads and how it is controlled (Rushton et al., 2012). At the same time, given the conditions of poverty that also drive and sustain infections in both animals and humans in remote, low-resource communities, control of zoonoses may also need to address problems surrounding access to safe water, basic sanitation and improved living conditions.

6. Chapter Six: Health-Seeking Behaviour and Decision-Making in Naiti

6.0 Introduction

This chapter considers treatment options for febrile illness and how health-seeking decisions are arrived at. In Naiti, health-seeking ventures are not rooted solely in the individual; rather, they are dynamic, collective and interactive processes between lay people and local health systems, playing out in ways that are complex and that go beyond a single episode of illness, or indeed an individual herder (see also McKian, 2003: 1). At the same time, decisions about how and where patients seek treatment are influenced by multiple interpretations and perceptions of illness at home and in sites where health-seeking occurs. As I illustrated in Chapter Five, perception and interpretation of health and ill health are crucial elements influencing treatment choices for febrile cases in Naiti. In this chapter, I show the complexity underlying local people's illness behaviour. Beyond well-known barriers to health-seeking such as a lack of resources and infrastructure, in Naiti, patients' interaction with local health systems is also influenced by social, cultural and inter-/intra-household power dynamics. In this introduction, I begin by characterising the nature of healthcare services in Naiti before discussing how families engage with these services within local pluralist health systems.

The range and diversity of healthcare provision (both formal and informal) in Tanzania is more complex than is assumed, and as I discussed in Chapter Two, there is little systematic research on healthcare services in northern Tanzania in particular, albeit heavy reliance on informal providers and poor quality of care is generally assumed (see for example, Leonard, 2007; Leonard and Masatu, 2007; Mackintosh and Tibandebage, 2002 on health systems in Tanzania).

In Naiti, the informal health sector (discussed earlier in Chapter Two) provides the bulk of healthcare for many families. In most "ordinary" febrile cases, self-treatment with herbal medicine (foraged from forests) as well as self-administered allopathic treatment (medicines are obtained from friends and families or bought from grocery shops as in Figure 6.2) is commonly used. In other more severe cases of febrile illness, informal providers are consulted. These include unlicensed, and untrained drug sellers (often referred to as "bwana dawa" or *medicineman* or "dokta" or *doctor*) who purchase both

allopathic and herbal medicines in bulk from retailers operating in trading centres or pharmacies, and who then move around villages either on bicycles or on foot to sell them in small quantities to their clients. These sellers have specific days and times when they visit the village and they have itinerant or mobile vending operations from where they dispense their medicines. One drug seller operated from a basic “shop” in the village (see Figure 6.2) where he also sold general household merchandise, alcohol and tobacco. I encountered up to 45 of these mobile drug peddlers during my time in the village. They operate outside any regulatory framework, and in many cases they sell prescription-only medication including “antibiotics” (assumed to be penicillin and amoxycillin), which are often sold unlabelled and in clear plastic bags. They also offer diagnostic and therapeutic medical advice to patients and their families.

The second most utilised health providers in Naiti are traditional medical practitioners who mainly operate in exclusive spaces and are consulted in great secrecy, to the extent that users shied away from discussing their visits with me, due to the stigma associated with traditional healing practices, particularly from Christian religious entities that I mentioned in the preceding chapter. Traditional practitioners primarily utilise non-allopathic modalities such as engaging with spiritual deities to diagnose health problems and herbal medicines for treatment. Traditional birth attendants are also common but I did not explore these providers as they were beyond the scope of my investigation.

Naiti village dispensary (described in Chapters One and Five) was the closest and often the only contact that people had with formal healthcare, although in a small number of cases the clinician made referrals for some patients to visit the district hospital in Arusha when illness was perceived to be severe. However, this dispensary was the least utilised health service by the residents due to a host of factors that I will discuss below. Families who perceived their patient’s illness as “hospital sickness” and could afford to go to hospital pursued this route, preferring health facilities further afield, in Arusha or Monduli, where they perceived the quality of care to be better than that of the local health dispensary.

The remainder of this chapter proceeds as follows.

Section 6.1 discusses the local health systems as plural and hybrid and illustrates the dynamic ways in which families in Naiti engage with these systems. Section 6.2 characterises illness behaviours and attempts to conceptualise these through the health

belief model, introduced in Chapter Two. Section 6.3 discusses approaches to treatment-seeking for the febrile categories described in Chapter Five, and Section 6.4 examines the nature of decision-making in the household. Section 6.5 explores how dynamic and gendered inter- and intra-household power relationships affect health-seeking decisions. Section 6.6 discusses respondents' perspectives on the quality of healthcare services in Naiti, and how these perceptions influence lay health-seeking behaviour. Finally, Section 6.7 synthesises the discussion in this chapter by emphasising the collective experience of illness, which may challenge biomedical approaches to zoonoses that prioritise individual patients and/or single illness episodes.

6.1 Health-Seeking for “Social” Illness

Lay aetiologies of febrile illness, described in Chapter Five, influence people's illness behaviour. They determine which illness labels are assigned, and which therapy or therapies are applied, as well as how these are evaluated. Lay interpretation of symptoms and labelling of illness are based on the location of pain or discomfort and on the gut. Just as Kleinman (1981) elaborated on in an anthropology of lay illness behaviour, and as demonstrated in chapters Four and Five, participants in this study did not always perceive illness as requiring treatment. For instance, in febrile episodes where symptoms were interpreted as constituting “normal” or “ordinary” fever, participants sought no treatment during the first three to four days.¹⁰¹ It was only after symptoms persisted beyond this period that therapeutic options were considered. People accepted some form of bodily malfunction as necessary to enhance one's “strength”, akin to biomedical approaches to fever being an antibody that fights against infections, as explored in the preceding chapter.

Wade and Halligan (2004: 1) argue that biomedical approaches to illness do not fully explain many forms of illness because they assume that “all illness has a single underlying cause, disease (pathology) is always the single cause, and removal or attenuation of the disease will result in a return to health”. The authors note that this leads to the medicalisation of commonly experienced illnesses that may defy such categories, as in the case of fever being normal and expected among some participants in Naiti. In these cases, and as Turner (1967) suggested long ago, illness can also be a social construction of one's own perception of an (un)healthy social context, as it is subject to emic

¹⁰¹ See also Jephcott's (2013) study of febrile patients in Ghana.

interpretations that are a result of situated social, cultural and ecological realities. Furthermore, as articulated in the WHO's definition, health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (French et al., 2010: 137).

Similarly, Good (1994: 37–38) highlights that biomedicine and medical behavioural sciences may view responses to illness that differ from the assumed rationality of physicians as superstitious and resulting from a lack of information. In contrast, Good's own argument grounds lay interpretation of illness symptoms and associated healing modalities in a system of plural beliefs and cultural practices that have been adapted and transformed in order to respond to dynamic health problems. Regarding lay health practices, Good (1994: 39) emphasises that:

The practices of [lay people] in relation to disease are not a medley of disconnected and meaningless customs but are inspired by definite ideas concerning the causation of disease. Their modes of treatment follow directly from their ideas concerning the etiology and... their practices are a logical consequence of those beliefs.

Thus, lay aetiological beliefs that shape treatment-seeking behaviour ought to be considered within a broader material and social context, as these can act to constrain the possibilities for action to achieve optimal health outcomes (Langwick, 2008).

Among participants in Naiti, common beliefs about particular historically accepted signs of health and ill-health such as fluctuation in appetite, changes in the gut, skin texture and colour in patients (based on cultural perspectives of health, past illness experience and local illness taxonomies, discussed in Chapter Five) helped determine the perceived importance of symptoms and the subsequent use of medical resources. The local classifications of febrile illness described in Chapter Five reflect the importance that people placed on these illnesses and how they responded to them. Common responses to febrile illness in adults followed a logic of trial and error, involving the application of various therapies depending on their availability and cost, as well as the household dynamics that I discuss below. As mentioned earlier, these therapies were often a hybrid of traditional/herbal medicines and in some cases, pharmaceuticals obtained from unlicensed drug peddlers either in the village kiosk or in nearby markets such as in Makuyuni. Almost all therapies used were accompanied by, or mixed with, fresh (often uncooked) milk and/or fat extracted from slaughtered animals or soup from boiled animal

meat. As I referred to in the preceding chapter, uncooked milk was preferred for mixing herbal therapies because of the belief that cooking compromises the healing properties in the milk. These animal products were perceived by participants to contain healing properties and to aid in limiting the negative side effects of pharmaceutical drugs. Milk, especially fresh/uncooked milk straight from the cow, was also used as an intestinal cleanser that contains purgative properties, and therefore it was frequently consumed by most households regardless of whether they were ill or not.

Some households stocked paracetamols and antibiotics bought from local peddlers and frequently ingested these with milk even when there was no illness at all, and this habit was meant to “protect” the body against future infections. In many cases, where illness was perceived as “new/unusual” fever, which typically implied unexplained febrile illness, households reached out to their social networks or lay referral systems (Sharma, 1992), to locate previous similar experiences and to base treatment on those experiences.

Illness recognition and labelling are a function of memory, based on previous illness episodes and a set of illness categories or a *taxonomy of illness* (Fabrega, 1975), upon which the patient and his or her family judge the symptoms. In other words, rather than a specific label assigned to a specific set of syndromic and descriptive symptoms (see, for example, Queenan et al., 2017), illness labels draw from a range of possible options, as covered in Chapter Five. Once a label is assigned to an illness, it becomes a powerful determinant of treatment-seeking, based on a complex negotiation processes involving lay referrals and other social, cultural, financial and infrastructural considerations, discussed later in this chapter.

Labels are employed to simplify the complexities of the socio-cultural and biological processes that produce illness, or as Eyben and Moncrieffe (2007: 66) explain, to inscribe and “enable the very construction of social reality”. Thus, in merging the symptoms into one label of, for example, malaria or typhoid, Naiti residents were trying to make sense of and legitimise their use of scarce medical resources. For example, labels that constituted normal or ordinary fever downgraded illness symptoms, with the implication that patients were expected to continue normal activities with little or no treatment, whereas a “sick role” (see Kleinman 1988) was assigned to patients where illness labels reflected severe forms of illness, and whereupon investing family resources in treatment was justified. In other words, labels helped to compartmentalise social realities and

perhaps to help people manage health risks and trade-offs in the context of scarcity.

6.2 Towards A Health Behaviour Model for Participants in Naiti

This section advances a broader understanding of how communal organising, social relationships and collective resources are mobilised to solve people's health problems (see also McKian, 2003). Although this study is primarily focussed on health-seeking behaviours for febrile illness, these behaviours were not unique to how people sought help. Rather, many other health problems were approached in a similar way. Patients generally progressed through several stages of the febrile spectrum (described earlier) before they decided to seek help.

Health-seeking itself followed a process suggested by theoretical models such as the health belief model (Frankenberg, 1993; Calnan, Champion and Skinner, 2008; 1987; Lieban, 1977; Kleinman, 1988; 1981). The health belief model posits that treatment-seeking for the ill starts with an evaluation of symptoms to determine their significance, assessing whether these symptoms can be managed using home-based remedies or if treatment is required. If treatment is required, then the next stage of the process involves judging the feasibility of, and options for, treatment (see also Goldberg et al., 1980). This model, first introduced in Chapter Two, provides a framework that can help in understanding the health-seeking behaviour of participants in Naiti.

As I discussed earlier, in Naiti, the mere availability of services and drugs does not guarantee people will access these resources. Instead, demographic factors such as households' socio-economic status, education, household heads' sex and age, distance to the health facility, and the quality of healthcare services influence people's decisions regarding the type of treatment to seek (see also for example Schneider, 2017; Beiersmann et al., 2007; Leonard, 2007; Conner and Norman, 2008). Although the health belief model is based on the idea that lay behaviour and motivations behind treatment-seeking decisions depend on the value people place on the benefits of taking a specific action to respond to ill health (Rosenstock, 1974), it also assumes that people have choices available and that they can weigh the cost and benefit of each. However, though this may be the case in some contexts, in Naiti, healthcare options are limited, which means that people often use the most feasible option available to treat illness regardless of the outcome or perceived benefits (or lack thereof) of the chosen route of treatment. For example, boy herders who spend days and sometimes weeks away from home in dry

season camps herding livestock rely on herbal remedies which they forage from the forest to treat both minor and more serious illness occurring during these periods. The care-seeker in this case, as Good (1994) observes in other contexts, is not ultimately free to make voluntary choices as is implied in the health belief model.

The following example of Neema's illness provides a specific example of how choice in Naiti is constrained by a variety of factors. Neema is a young mother and the second wife in a polygamous marriage. She fell ill with what she believed to be *taifodi* fever. She bought a course of what she believed to be amoxicillin antibiotics (because they were not labelled) from a drug peddler, costing her 5,000 Tanzanian shillings, which she made from selling milk and other small wares at the nearby market. She used these drugs alongside herbal remedies for four days, but her symptoms persisted. She had the money necessary to attend to the local clinic (being younger than 65, she would have had to pay a standard fee of just 2,500 shillings) to be examined by a clinician but could not simply go because of her position in the *olmarei*. Her husband wanted to consult his first wife in advance of Neema making the journey, because this first wife was older and was perceived to be more experienced in interpreting illness symptoms. Moreover, in this case, the husband thought that Neema's condition was improving and thus that she did not need to go to the doctor. Although he perceived the illness to be "severe" fever, he did not believe it to be a "hospital disease" worthy of spending money on (see also Winch et al., 1996). The first wife shared the husband's view and so Neema's decision to visit the doctor was curtailed.

This example demonstrates how men in Naiti downplay febrile illness and delay treatment for fever unless they perceive it to be "unusual/new" fever (discussed in Chapter Five). In contrast, women generally take "severe" fever seriously and seek treatment earlier because they believe that any delay in health-seeking could lead to symptoms escalating into critical illness that will take them away from their household chores. However, such binary classifications of gender and health only provide part of the health-seeking explanation. As is evident in the example of Neema, women's health-seeking is also curtailed by the power relations within and between households. In this example, Neema's co-wife's position within the marriage, her age and perceived experience in labelling illness as well as her relationship with her co-wives, influenced Neema's husband's willingness to support and allocate resources for treatment, and this has implications for when potential zoonoses are detected, and in whom. One of the

subsequent implications is that treatment is delayed, and “severe” fever may not be addressed until it is too late, even for relatively wealthy household members, because of these complexities. Clearly, in this situation, even if Neema had been able to weigh up the costs and benefits of available options and determined she would benefit from visiting a doctor and could afford the cost of treatment, she was unable to act on her choice. This was because she was not the main decision maker and, ultimately, she had little influence on the decision to seek healthcare. As Poortaghi et al. (2015) have argued, an awareness of these factors is imperative to the planning process for successful interventions and the expansion of existing health services in any setting.

Health-seeking is about aspiring to have an acceptable level of well-being based on the awareness of the health problem and cooperation on the part of patients, their families and local health systems (Poortaghi et al., 2015; Bloom et al., 2008; Marsland, 2007). It is an approach through which people can monitor their bodies or, as Turner (1967) added, their social contexts, to distinguish between symptoms and interpret them, to look for medical interventions and apply other supportive resources when deemed necessary. In Naiti, participants engaged with social networks based around family and kin to collectively interpret and label health problems. Community elders (both male and female) who enjoyed significant social power often explained symptoms and labelled illness within an existing socio-cultural framework. Elders do not always have the final say in relation to an illness diagnosis, as there is great emic diversity in the way people act in response to febrile illness. They do however influence what treatment is pursued, especially if it involves financial costs. For example, where family members disagreed over illness symptoms, an experienced elder in the family was consulted to interpret symptoms and recommend the most appropriate treatment. There were situations where patients thought they had a “severe fever”, but elders downplayed it to “ordinary fever” and recommended herbal remedies.

Sometimes, as I noted earlier, younger people, especially boys, were more likely to prioritise hospital treatment for severe febrile illness over at-home remedies. The boys perceived this treatment as aiding faster recuperation, to in turn enable them to resume their very important herding chores. Men in general, and younger men in particular, are exposed to towns and markets such as Makuyuni, where they interact with a diverse selection of therapies, as opposed to older cohorts of the population who often rely on traditional herbal remedies, which they were also most familiar with. As I noted in

Chapter Five, young people tended to associate pharmaceutical drugs and/or going to the hospital with being “modern”. Therefore, delays in presenting at formal health facilities, and therefore early detection of potential zoonoses, could be a bigger problem for older people in Naiti, as well as women of all ages, than among the younger male population, as Table 5.1 also illustrates.

In human illness, framings of severity were similar to that of livestock. Many times, severe illness with unknown causes, such as “new/unusual” febrile illness, was accredited by participants to spiritual causes, and patients and their families commonly believe such illness to be a form of punishment brought on by *Enkai* (God), as a sanction for deviant behaviour. In such cases, animal blood is often used to dispel perceived familial and communal misfortune. Thus, in Naiti, everyday practices that facilitate a feeling of “belonging”, such as collective rites of passages (births, marriages, funerals), are also occasions for healing rituals where milk, meat and blood are mixed with medicinal herbs and ingested by people. Animals are thus ambiguous, representing both social and physical healing and, on occasion, sources of illness. Sick patients are encouraged to consume uncooked milk, meat and fat for their therapeutic properties, as it is believed that cooking these products reduces their effectiveness in healing. Additionally, all therapies, including pharmaceutical drugs, are consumed alongside uncooked milk, which is also a key ingredient in the preparation of herbal medicines used to treat common illnesses.

This ambiguity around healing is also reflected in other forms of treatment. As already noted, the informal health sector, characterised by unlicensed drug peddlers who diagnose both human and livestock illness, is dominant. Naiti’s residents seek “expert” advice when treatments are ineffectual or when illness symptoms become severe. “Experts” include anyone who sells drugs, such as unlicensed peddlers, shop keepers and pharmacists, both inside and outside the village. For the latter, consultation is usually made by mobile phone: once symptoms have been described, the drug seller offers a presumptive diagnosis and suggests a prescription. In most cases, the suggested therapies are then borrowed from extended family members that stock them. Sharing medicine (both traditional and allopathic) is a fairly common practice in the village, and whenever there is a severe illness episode, in the first instance, patients’ families consult kin and neighbours for medicines. Ultimately, the decision to consult others in illness diagnoses rested on the patients’ (and/or their carers’) familiarity with a set of historically acceptable

symbols or symptoms signifying a particular illness, such as, for example, cold chills and muscle pain for perceived malaria, or wheezing and shortness of breath for pneumonia, as detailed in Chapter Five.

For the patients and the families that I spoke to, both the exercise of labelling an illness, and the decision to seek treatment (of whichever nature), were based on social norms about the human body and perceptions of what was a normal, healthy body and what was not. As an example, a group of older women came together to help Nasaya, the young mother pictured in Figure 6.1, to understand and explain her illness. She had complaints ranging from pain in the neck to fever (hot body, chills, headache and sweating). Since this did not fall into a category of illness that she and her family had experienced before, she had found it necessary to consult those of her female friends who were senior to her in age, and who she therefore regarded as more knowledgeable, to assist with the diagnoses.

Figure 6.1: Nasaya being Examined for Symptoms of Illness by Local Illness Referral Group.



After carefully examining her body, Nasaya's friends concluded that she was suffering from "unusual fever", because her symptoms kept coming back. They also suggested prompt treatment with biomedical drugs and/or a visit to the hospital. But as I illustrated

earlier, the decision that Nasaya should seek treatment, and the type of treatment to pursue, would prove more complicated and went beyond the young mother herself and the friends who helped with the diagnosis. As an unmarried woman who had returned to her father's house after her marriage had broken down, she would have to consult her father about the illness label and the recommended treatment, and if it required money then her father would make the final decision as to whether to allocate the money or to advise Nasaya to pursue at-home treatment. Luckily for her, and because the illness fell within the category of "unusual", her father sold a family goat to raise the money that Nasaya needed to go to hospital in Arusha for treatment. This example again shows the power of labels and how family dynamics and gender factors can influence what actions are taken during illness episodes (see Eyben and Moncrieffe, 2007, on the power of labelling).

6.3 Characterising Approaches to Treatment of Febrile Illness in Naiti

In this section, I describe the treatment-seeking behaviours for febrile illness in more detail, in order to show the socially expected routes of treatment, and later I discuss the complexities around these expectations. As introduced above, treatment for fever corresponds with the morbidity continuum and aetiologies described in Chapter Five, namely that fever could be an "ordinary" illness or, where it persisted, people interpreted febrile symptoms as constituting "severe/serious" fever which could, if left untreated, develop into typhoid, pneumonia or a urinary tract infection, and, lastly, that fever can also be an "unusual/new" illness whose aetiology and treatment course is locally unknown. I discuss approaches to each of these labels below.

Approaches to Treatment of Usual/Ordinary Fever (*Homa ya Kawaida*)

As explained previously, "ordinary fever" is not considered to be a serious illness. Respondents cited symptoms of this type of fever as blocked nostrils, wheezing or sneezing, body weakness, runny eyes (and nose), and lack of appetite or "loss of food smell and taste".¹⁰² This illness was perceived to be caused by elements within the environment such as dust, changes in weather (cold, wind, heat) or certain kinds of food (e.g. too much sugar). Participants often downplayed the effects of ordinary febrile illness as they did not generally perceive it as a threat to their normal daily functioning. In fact, patients were expected to go about with their usual daily activities, as one respondent

¹⁰² Interview, Naiti, 10 May 2017.

explained:

If it is the *ordinary* fever, you have a running nose, sore throat, mild headache, and it can go away within a few days; three or four. To treat it, you can drink a mixture of fresh milk and *oloisuki* [a type of lime tree found locally and whose leaves are harvested and crushed into juice]. Everyone has normal fever every now and then. We usually continue doing our normal duties. This fever does not kill people.¹⁰³

A majority of participants did not perceive “ordinary” fever as warranting a hospital visit or biomedical treatment. Severity or seriousness was understood in terms of potentially causing death, rather than in the discomfort associated with “ordinary fever”. Treatment for “ordinary fever” was included in everyday behaviour. It was common for local therapies such as roots, leaves and barks of trees to be foraged and preserved in the house, and these were frequently prepared and added to beverages (milk, tea, water) that people drank to improve body “strength” and strength.

Additionally, cultural norms regarding which illnesses are discussed in public, and by whom, and which are not, influenced how people reached decisions on what treatments to seek. For instance, people are not expected to discuss common, non-serious febrile illness. “Ordinary fever” is undoubtedly not an illness to express any complaint about or to visit a doctor at the onset of first symptoms, without having first attempted to solve the problem on one’s own. For example, Lemaye, a young herder who I found lying in the shade while his herd browsed nearby, looked visibly ill and was coughing and sneezing uncontrollably. I asked him why he did not consider going home to rest or visiting a doctor, and his response was:

I am a man, and therefore I cannot say that I am ill because of a small fever like this one. I will take herbal medications at home when I return in the evening.¹⁰⁴

Here, the gendered norms and expectations of who can complain about being ill and with what illness influenced the herder’s behaviour. This has implications for early detection of febrile illness which may or may not be associated with zoonoses. As Lieban (1977: 23) pointed out, concepts of illness are cultural classifications of adversity and they reflect people’s views of misfortune in a general sense, or their specific outlook on disease and

¹⁰³ Interview, Naiti, 14 May 2017.

¹⁰⁴ Participant observation, May 14 2017.

its place in their lives. Where Western science sees health as the normal state, and disease as abnormal, requiring medical intervention and perhaps eradication, people in Naiti regarded uncomplicated febrile illness as something altogether natural, almost inevitable and as a potentially manageable part of the environment (see also Homewood, 2008: 172).

Similarly, Leach and Dry (2010: 5) observe that:

From a perspective focussed on disease-specific interventions and biomedical control, epidemics are implicitly linked with the goal of disease eradication. From another perspective, the same diseases could be seen as part of the historical, geographical and social landscape, something to be accommodated when possible and suffered when not.

From a broader perspective, and as Kleinman (1988: 5) also illuminates, illness is “the social recognition that a person is unable to fulfil his [or her] normal roles adequately, and that something must be done about the situation”. However, where illness is not seen as altering the normal functioning of one’s life, as in the case of the boy herder above, it becomes something to be expected, endured and managed. Disease, however, is what the practitioner creates by recasting illness in terms of theories of disorder, a pathological concept (ibid.). These distinctions are important because what people reported to me as illness, and against which they had self-assigned biomedical labels, could in fact have been totally different to their medical equivalents. *Homa ya kawaida* may not be classified as cold or flu by medical practitioners, yet these are the labels that people used and which informed their delays in healthcare-seeking. Similarly, even though people might have thought that they had *oltikana*, *taifodi* or *nang’ida* (see Table 5.2), because of the nature of their symptoms, which overlap with many other febrile illness categories, and a worldview that endured illness, they would not seek professional help if these illnesses manifest as “ordinary fever”.

Approaches to Treatment of Severe/Serious Fever (*Homa Kali*)

The concept of “severe fever” is, as its name suggests, associated with illness that severely affected one’s ability to carry out daily tasks such as herding, farming, and household and community activities. The patient in this case is assigned a “sick role” (Kleinman, 1988), which delegates their activities to healthier members of the patient’s family. Patients are expected to rest at home and to be nursed by their families and friends. People generally discuss such illnesses in public, and neighbours pay visits to the sick, bringing with them milk and cooked meat soup mixed with herbal medicines. As explained in Chapter Five,

this illness represents anything from malaria, pneumonia and typhoid to (albeit to a lesser extent) UTIs, particularly in febrile children.¹⁰⁵ “Severe fever” is considered a very serious illness in children, with possibly fatal consequences. Mothers of sick children are indispensable in making decisions regarding treatment-seeking for their small children, particularly as hospital treatment for children under five years old is free at the local health dispensary. However, younger mothers in extended families are still expected to consult their seniors about illness symptoms before taking the children to the clinic. In infants especially, severe febrile illness is taken more seriously than among other groups, as was articulated by various mothers I interviewed:

‘Severe fever’ is very bad for children in our community. As a mother, you can see when the child is developing this illness and you must hurry to take the child to the doctor because if you give traditional medicine to the sick child, she or he may die because you are not sure if the illness is malaria, typhoid, pneumonia or the urinary tract infection, as the child cannot explain the symptoms as adults do.¹⁰⁶

My child died because of this fever. We delayed; we did not have the money to buy the medicines [pharmaceuticals] that the doctor prescribed, and we did not have a phone to call my older son who lives in Makuyuni for help. I gave him paracetamol which we were given at the clinic, but it was no good because we needed antibiotics. Paracetamol can only treat ordinary fever but not severe fever.¹⁰⁷

“Severe fever” is not, however, a homogeneous category. Participants distinguished between many varieties of “severe/serious fever” using general syndromic descriptions involving the specific location of pain or discomfort (for example, *my head hurts* or *my body is hot*), and the timing and duration of the illness (*it is worse at night* or *the pain stays the whole day*). And as explained in Chapter Five, there were gender-based variations in labelling febrile illness. For instance, where male patients described “severe fever” as *nimonia*, *TB* or *taifodi* fever, women described these symptoms mainly as *malaria*. This difference in interpretation of symptoms can be attributed to the fact that men spend greater amounts of time outside the home and in the cold during the wet

¹⁰⁵ Although adults complained of UTIs, it was more common for people to talk about the infection in febrile children than among adults. I found that people associated UTIs in adults with promiscuity, and believed they were sexually-transmitted, but in children they associated them with washing in contaminated water and living in an unsanitary environment.

¹⁰⁶ Interview, Naiti, 12 March 2017.

¹⁰⁷ Ibid.

months of year, giving rise to a higher risk of infections such as pneumonia, whereas women are more likely to be exposed to mosquitos around the bushes or water points where they forage for provisions, and are therefore more susceptible to mosquito bites that could result in malaria. Women told me that they preferred using allopathic therapies to cure malaria, although this did not always happen because of resource constraints and unequal power relations within the *olmarei*, while men often talked highly of using traditional therapies to cure all “severe fevers”. Consequently, women had greater expectations of being diagnosed with malaria if and when they visited the local dispensary. In one instance, where this was not the diagnosis, the woman told the nurse she would go somewhere else for a “better” diagnosis. She went to the village drug store (see Figure 6.2) where the seller, an unlicensed drug store keeper, “diagnosed” (because this was based on symptoms alone) the woman’s illness as “malaria” and prescribed treatment involving a course of antibiotics.

Figure 6.2: The Village Kiosk or “Duka” that Stocks and Sells Animal and Human Medicines Alongside Household Items.



Approaches to Treating Unusual/New Fever (*Homa Mpya*)

The third and final febrile illness category is that of “unusual” or “new fever”. As elaborated on in Chapter Five, this concept is used to describe the despair of the unknown because the illness is locally unfamiliar, and the “newness” implies that people do not know what has caused it or how to treat it. The concern generated by this type of fever is evident in people’s descriptions of it as *the fever that comes today, goes tomorrow, returns the next day* (see Chapter Five). As I pointed out previously, this description is consistent with biomedical prognosis for many zoonotic fevers (see Crump et al., 2013; Halliday et al., 2012; WHO, OIE and FAO, 2004). This fever also typifies what Winch et al. (1996) define as a “hospital disease” (i.e. a disease that local people generally associated with hospital treatment) in their study of local classification of febrile illness in Bagamoyo in Tanzania. In Naiti, this “unusual” febrile illness can afflict all groups across all ages, and one herder summarised its contagious potential as follows:

No one is safe in this village. This illness does not know whether you are a child or an adult. No treatment can finish it, only the modern [biomedical] doctor can.¹⁰⁸

Participants stated that there was no indigenous or “African” remedy for unusual febrile illness, and this is illustrated in the following quotations from several respondents:

There is no African remedy for this illness. We have tried everything: milk, herbs, but nothing works. Only the doctor will manage it, but where is the money to pay?¹⁰⁹

We do not know the illness itself, so how can we know its treatment?¹¹⁰

I think it is an illness caused by consuming modern foodstuffs such as processed cooking fat, salt and sugar. In olden days we did not suffer from it.¹¹¹

You can call it *malaria*, but it is much more superior version, because it is just like *malaria* except it does not go away easily.¹¹²

At the village health clinic, I interviewed the clinician about this illness and, while he did not fully accept the categorisation of this fever as new, he confirmed the need for medical

¹⁰⁸ Interview, Naiti, 14 May 2017.

¹⁰⁹ Focus group discussion, Naiti, 17 May 2017.

¹¹⁰ Interview, Naiti, 17 May 2017.

¹¹¹ Key informant interview, Naiti, 2 June 2017.

¹¹² Ibid.

treatment:

People are confusing everything. If they don't know how to treat the illness, they say it is new. But it is mostly a combination of many illnesses that they delay seeking care for. If this happens and they come here, I refer the patient to the doctors in the district hospital in Monduli or Arusha where they get tested for more things than I can test for here. I believe they are referring to *cerebral malaria*, but I am not sure.¹¹³

Although some people reported visiting the clinic when they suffered from “severe fever”, the majority of respondents treated it with allopathic drugs, often antibiotics obtained from the village shop or shared by families who stocked them at home. In most cases, patients were encouraged (by their families and as well as by the clinician at the health centre) to drink milk, as milk was believed to fight the illness and strengthen the body's ability to withstand infections. This contradiction exemplifies the mismatch between risk-factor approaches to the study and control of zoonoses, and the realities and approaches of lay people in managing and coping with febrile illness.

6.4 Complexities and Negotiations of Health-Seeking in Naiti

As illustrated above, households make decisions about treatment based on their interpretation of symptoms and perceptions of severity, and delays in treatment-seeking are necessitated by a host of social, cultural and economic considerations. Social and cultural concepts of illness interact with a myriad other structural and economic challenges impacting on people's choices and access to healthcare. However, assumptions regarding how people can be expected to behave with regards to health-seeking in places like Naiti cannot be easily made, because of the plural and collective experiences of illness that go beyond a single episode of illness, and beyond an individual patient. Thus, what have been emphasised by health systems literature as conventional barriers to health-seeking in medically-underserved settings, such as accessibility to healthcare services, cost (and so one's ability to pay for healthcare), awareness of the availability of health services etc., may not be the only considerations in health-seeking decisions in Naiti. For instance, in Tanzania, studies have shown that barriers such as user fees, lack of infrastructure and poor quality of care exist and are responsible for delays in health-seeking, particularly in remote livestock-keeping communities (Mackintosh and

¹¹³ Interview with clinician at Naiti health dispensary, 4 June 2017.

Tibandebage, 2002; Munga and Maestad, 2009; Leonard and Masatu, 2007; Gwatkin et al., 2000; Leonard, 2007; Mubyazi et al., 2006).

However, as findings in this chapter show, and as I have elaborated on throughout chapters Four and Five, it is the interplay between collective and dynamic approaches to health, the broader social and cultural interpretation of health and ill health in people, animals and the environment, and the gender-based power relations at the household and community levels that play out in decisions regarding seeking treatment in times of illness. Social and cultural attitudes towards health such as I have discussed above and in Chapter Five have significant influence on local healthcare-seeking behaviours. These include lay perceptions and interpretations of health and ill health, ideas regarding quality of healthcare and benefits of treatment options available to patients and their families, threat of illness (perceptions of symptoms and beliefs about susceptibility to and the consequences of the illness), illness aetiology and past experiences with similar illness in the family, social networks and the organisation of lay health systems, religious beliefs, and, finally, gender differentiation, age and status of the patient and his or her family.¹¹⁴ As I illustrate below, it is the interplay between these factors that enables or inhibits early treatment-seeking among the WaArusha. Although I have discussed ways in which people are expected to approach treatment for the three categories of febrile illness above, in reality, these processes are non-linear and complex, and with outcomes that cannot be easily anticipated. A few cases, however, did conform to the above expectations. For example, the young herder (highlighted earlier) who continued with his herding chores even though he was visibly ill, but due to the social perception of “ordinary fever” being normal and not needing treatment, he endured his illness, which may or may not have been a much more serious condition that could have had serious consequences on the boy’s health outcomes. The second example, a 40-year old man (in Chapter Five) who was told by his friend that he may have suffered from “milk” fever because of his recurring febrile illness, and who did go to hospital and was diagnosed with brucellosis, an “unusual fever”, confirms that when told that they have unusual illness, men are more likely to seek medical help more promptly than if they believe their illness is usual or ordinary.

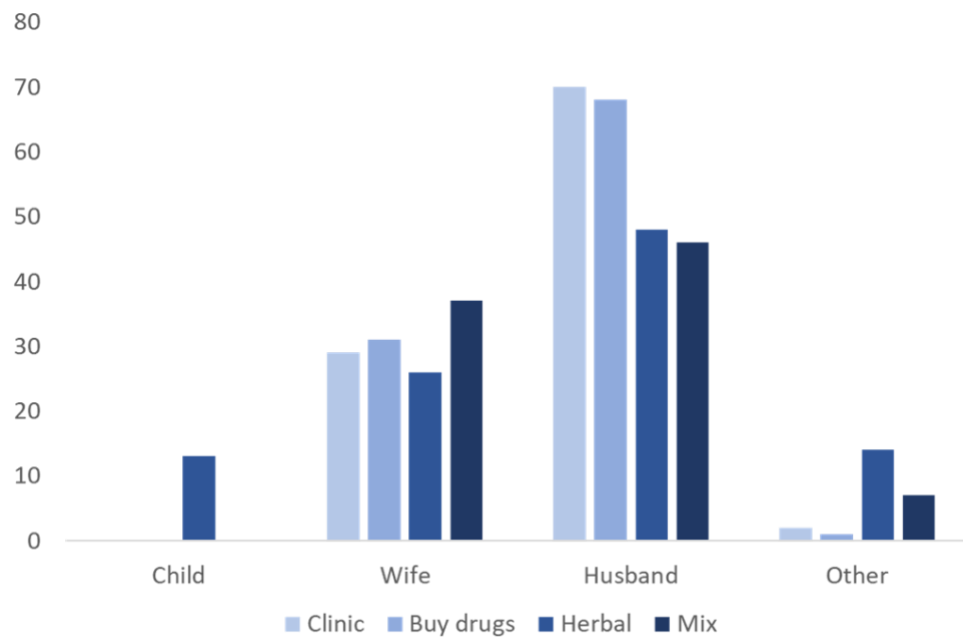
¹¹⁴ See also Pillay (1996) on how these factors play out in South Africa.

In most cases however, the process of health-seeking is ridden with complexities and negotiations. Even where households live close to the health facility and can afford treatment, social relations and household negotiations determine whether resources are allocated for treatment or not, and which illnesses are given treatment priority, and which are not. I discuss these complexities below.

6.5 Inter- and Intra-Household Power Dynamics

Inter-household power relations involving several wives within a given *olmarei* affect patients' health-seeking behaviour. Whereas there seemed to be cooperation and swift consensus on when, where and how to treat infants when ill, the situation is less straightforward for illness amongst adult members of the household. An adult man has various households (in polygamous marriages) that make up one *olmarei* (see description earlier in the Introduction and in Chapter Four). A husband heads the *olmarei* and makes decisions for the family, including allocating resources across the sub-households or *ajis* to meet their everyday needs. But allocation of resources in the *olmarei* is complex and dependent upon the needs, relationships and negotiating power of different family members. This has implications for health outcomes, especially where treatment involves financial resources. For example, in a survey, I asked 379 adults about decisions regarding allocation of resources for medical needs, and about who made decisions regarding where and what form of healthcare was used at the household. The results show that, in almost all cases, where treatment involved financial costs, men made the decision. Women, however, generally sought treatment earlier and made decisions where treatment was free, as in herbs, or borrowed from family and friends, or bought cheaper alternative drugs from informal sellers rather than from clinic or pharmacies (Figure 6.3).

Figure 6.3: The Main Decision-Maker for Household Treatment Routes.



As shown in Figure 6.3, for almost all treatment options available to the household, it is husbands (or male relatives if husbands are absent) who make decisions regarding which treatment to pursue. This is especially so when the treatment option is either to visit the clinic or buy drugs, both of which involve money. Wives are involved in deciding treatment options for themselves or their children when treatment is free, as in herbal therapies, or when relying upon already-stocked pharmaceuticals, either in the household or obtained from neighbours. Women foraged for herbal remedies from the forest and mixed them with milk or meat soup and blood, before either ingesting them or applying them topically to the affected part of the body. A female febrile patient explained that:

When I am ill, I start with what I can personally afford. I have to go to the forest because there is no fee for herbs. But with drugs I need money and my husband may decide to give it or not.¹¹⁵

As is evident from these findings, and well known in the literature, gender is a strong influence on health-seeking. For example, in Ghana, Agbokey et al. (2019) and Kuuire et al. (2016) found that male family members, particularly husbands, fathers-in-law or adult sons, decided on when and where women sought treatment during illness episodes. Similarly, in Palestine, Majaj et al. (2013) found that married women delayed treatment-seeking when ill due to household resource allocation which gave little priority to

¹¹⁵ Interview, Naiti, 29 June 2017.

women's illness. The authors argue that socio-cultural norms prevalent in the villages meant that women were not expected to discuss their illness or express any complaint about it, or to visit a doctor at the first onset of symptoms without having first attempted to solve the problems on their own. This led to severe delays in health-seeking, with negative impacts on women's health outcomes. In Naiti, obtaining a husband's consent, which also means obtaining money for treatment, is crucial to seeking professional healthcare and the reasons for the delays are, as I have shown above, not always financial. They include the need to confirm the nature of the fever (usual, severe or unusual), to have a positive role in the household and community, and, through social relationships and networks, to reaffirm patients' need to seek treatment and to be healthy.

As I referred to earlier, children's health, particularly herder boys, is prioritised both by the boys themselves and their families. Often, the treatment routes that are perceived to lead to the fastest recuperation (hospital treatment in this case) are pursued, as the boys' role in livestock husbandry is indispensable, and illness in a herder is detrimental to stock welfare. In cases of "ordinary fever", the boys in particular are expected to manage their illness while still going about their herding duties. Girls, on the other hand, negotiate for treatment through their mothers, which could imply that their health may be neglected where relations between parents are severed.

The Influence of Lay Referrals and Extended Families

In Naiti, lay referrals are consulted to identify and label illness, particularly if symptoms are of "unusual fever". Senior women wield influence when it comes to deciding upon which treatment their daughters-in-law and grandchildren use. They influence their married sons' decisions, particularly when costly treatments such as going to hospital or buying expensive medication are involved. One senior woman, for example, downplayed her daughter-in-law's symptoms and advised the family to use herbal treatments even though both her son and daughter-in-law thought going to the clinic would have been a better option.

In another case further illustrating these inter- and intra-household power relations, Naisula's three-year-old son started having convulsions accompanied with severe vomiting and diarrhoea. Worried that her son had "severe fever", she did not wish to delay his treatment and therefore the young mother decided to go to the village drug seller for advice and treatment. Her husband was not at home at the time and Naisula was not on

particularly good terms with her in-laws, which she attributed to her stance against polygamy (she is her husband's only wife), and so she did not consult her extended family about the illness or on the course of action that she was taking. This was in contradiction to social expectations. The drug seller sold Naisula some paracetamol and a syrup and suggested that she take her son for an injection to cure the convulsions. While still at the shop, Naisula's mother-in-law caught up with her and took the baby away, accusing Naisula of "trying to kill the baby by acting alone in secrecy".¹¹⁶ By "secrecy", Naisula's mother-in-law was emphasising the collective approaches to illness, where diagnosis and decisions regarding treatment are discussed, and advice sought through a process of consultation between younger and older family members. In this case, it would have been Naisula's mother-in-law who would have made the decision regarding where to seek treatment for her grandson, and not Naisula herself. When individuals take these decisions without consultation, their actions are described as secretive and suspicious, and social sanctions are meted out against such individuals, including isolation from communal events such as not being invited to birth/marriage and/or circumcision and death ceremonies. In Naisula's case, her mother-in-law was part of a local therapy management group or lay referral social system in a context where health and ill health are collectively experienced (see also Sharma, 1992; Kleinman, 1981; 1988), and the young mother, by acting alone, contravened these social norms. The mother-in-law's actions, taking the sick boy away and back to the extended family where the illness was identified and treated, were a social sanction against Naisula for her unexpected behaviour. Indeed, the boy was not returned to his mother until a few days later, and when he came back, he had incision marks on his skin, suggesting that a form of traditional healing ritual had taken place. Naisula had to apologise to both her husband and her husband's family for taking the initial decision to treat the boy alone without consulting her wider family network.

Lay referrals in Naiti are comprised of older and experienced members of the family such as parents, parents-in-law, traditional healers (when approved of by the head of *olmarei*) and more. Patients approach these people, who either collaborate in labelling illness or, where they are unfamiliar with symptoms, as in "new/unusual fever", advise patients to visit a trained expert, sometimes a medical doctor and sometimes a local healer. In turning

¹¹⁶ Interview, Naiti, 12 May 2017.

to lay networks for referral during illness, patients are seeking relatable illness experiences, as some expressed to me:

My mother told me that I had the same symptoms as my dead brother, and therefore she advised me to go to the clinic because this was a hospital illness.¹¹⁷

When we are ill, we go to my grandfather to tell us what the illness is. He knows many illnesses and their symptoms because he has lived for a long time and he has seen many of the illnesses.¹¹⁸

We have a group of people we go to when there is a health problem. If it is ordinary fever you do not need to consult them, but if you have serious [severe] fever, they can tell you which one it is because they are experienced and knowledgeable about illness and treatment.¹¹⁹

All of them [senior members in an *enkang*] have experienced this or another illness in their lifetime and they know if you have a similar illness or not. If they tell me to take my child to hospital, I trust them, if they say, this is ok, you can deal with it at home, I also listen to the advice because I trust them.¹²⁰

These examples demonstrate that Naiti's residents are not passive recipients of information and services, who will change their lifestyles in light of health information. Rather, health strategies have to be considered and negotiated with a range of active partners. Although individuals may know what affects their health, depending on their particular position in society (men who reject the need for biomedical healing, junior co-wives who have less power within the *olmarei*), they can find it difficult to take action as inter- and intra-family and gendered social relationships act as constraints.

This also shows that, more than anything else, cooperation and collaboration as well as negotiation within the household and with wider social networks of extended kin have a bearing on treatment-seeking behaviour both at the diagnosis and treatment stages. Amoah and Phillips (2017) also found this to be the case, noting that lay referrals had a crucial influence on determining which health services are accessed and when in Ghana.

¹¹⁷ Interview, Naiti, 12 May 2017.

¹¹⁸ Interview, Naiti, 12 May 2017.

¹¹⁹ Focus group discussion, Naiti, 14 May 2017.

¹²⁰ Interview, Naiti, 14 May 2017.

They found that the more resourceful and trustworthy a lay referral system was, the bigger the role it played in influencing communal medical activities.

Social Networks and Relationships: “Social Illness”

Nurturing one’s social networks and relationships is a part of what the WaArusha perceive as good health. As Kleinman (1988) and Turner (1967) have noted in other contexts, people can perceive illness as reflecting one’s fractured social relationships and not necessarily as a medical condition (a pathogen located in the patient’s body). In one case, in Naiti, Nosim, who was the second of Parsambei’s four wives, fell ill with a condition that was considered a serious/severe fever, and she wanted to go to the hospital for treatment rather than treat the illness at home. However, Nosim had strained relations with her husband at the time leading up to her illness and she also did not get on well with Parsambei’s other wives. For this reason, she lay ill in the house for four days without treatment, as she could not get her husband to give her money for medicine. I met Nosim on the fourth day of her illness and she said she was too sick to leave the house, adding that “the whole community hates me, that is why I am sick. Maybe I am the problem”.¹²¹ Nosim’s statement not only reflects the important role of social networks in health but also the fact that illness is not just medical; it is also social, and when one’s social relations are not good, as Turner (1967) also noted, that person’s body becomes ill, and the way to deal with illness in the body is to heal the fractured social relationships. Thus, health-seeking decisions are dependent upon the patient’s social relationships, not just with his or her immediate family but also with broader social networks.

Men’s versus Women’s Perception of Illness

As mentioned earlier and in Chapter Five, some men in Naiti downplay febrile symptoms and delay treatment until they are too ill to leave the house. And it is their social status as husbands, and therefore heads of households, that influences family members to mobilise resources for their healthcare. In one example of this, a patient Mappi fell ill and complained of a headache, vomiting, high temperature and joint pains. Mappi is a middle-aged man who does not have sons to help him with herding chores, so he takes his herd out in the fields every day, spending whole days there and returning home in the evening. Even though he was ill with what might be to fit the category of “severe fever”, it

¹²¹ Interview, Naiti, 5 June 2017.

was socially expected, and as Mappi himself told me, that “unless a man is dying the sun should not come up before him”.¹²² This meant that Mappi had to wake at dawn and ready his herd for the fields as he usually did. On the third day after the onset of the illness (and after having used home remedies to no avail), as he explained to me, he continued to “try to manage with it”, until his third wife (the youngest) persuaded him to seek treatment at the local dispensary. This third wife, in consultation with her senior co-wives and other family members, agreed that her husband’s illness was too severe to be treated at home and that going to hospital was needed to recover his health. She had some financial savings from selling chickens which the other wives did not, and she offered to provide the money needed for her husband’s hospital fees. He was treated for malaria at the local clinic. Mappi’s was in any case one of the wealthiest families in the village and he could afford treatment without needing the money from his wife. He did not, however, believe his fever warranted hospital treatment and therefore left the decision so late that his wives had to intervene, all because as a man he perceived illness symptoms differently from the women. Yet his position in the family as the household head was highly revered and therefore his ill health was a concern for all his family. He did acknowledge to me a few days after the treatment, by which time he was feeling much better, that “without my wife, I probably would have died”.¹²³

6.6 Anxieties Over the Quality of Available Healthcare in Naiti

Naiti residents’ expectations about the quality of treatment also influence how families engage with local health systems. A majority of respondents believed that good treatment, traditional or biomedical, ought to induce diarrhoea and/or vomiting, because they assumed severe fever to result from a clogging of the gut. Therefore, good medicine needed to contain purgative properties or intestinal side effects (see also Carruth, 2014). In a focus group discussion, one elderly woman told me that:

The paracetamols do not clean your gut, so you have to drink fresh milk regularly to clean up and get the fever out of your system. That’s why us herders, we do not like going to hospital regularly. It is because the Western medicine is not good for your gut, it clogs you up.¹²⁴

¹²² Interview, Naiti, 16 May 2017.

¹²³ Ibid.

¹²⁴ Focus group discussion, Naiti, 14 July 2017.

Some respondents openly discredited the services at the local dispensary, which they believed were not good because the doctor “only talks to you and does not use machines to check your pain”,¹²⁵ even though they simultaneously used this service, and they would buy drugs from an unlicensed seller who obviously did not have diagnostic tests or training. This desire for better healthcare and diagnostics points to broader issues regarding the inherent limitations in Tanzania’s healthcare system, explained in Chapter One. This is not unique to Naiti or indeed to Tanzania but is apparent across sub-Saharan Africa. For example, Carruth (2014) found that Somalis in the agro-pastoral Somali region of eastern Ethiopia also harboured anxieties about the poor quality of healthcare in rural health posts. She interviewed a patient who explained:

We do not trust those pills [from the recently opened health post] ... we do not have any idea about where medicines are from. When they [a medical aid organisation] left we have a big problem about malaria or a severe cough, if you have those diseases you cannot just go to the clinic here... they do not have a laboratory, so now we have a big problem. (Carruth, 2014: 411)

In Naiti, pharmaceutical drugs are easily accessed through the village kiosk or in nearby markets such as Makuyuni. Participants preferred buying these medicines rather than going to the village clinic because the facility did not have enough medicines to give out to patients, and the medicine that was available at the clinic was more expensive than from the kiosk. I caught up with one patient who was buying medicine at the local kiosk and she explained that:

I can easily buy medicine from the kiosk instead of going to the doctor because they make you wait for a long time, and then in the end they sell you the same medicine that you get cheaper at the kiosk.¹²⁶

Patients and their care-givers oscillate between herbal and pharmaceutical treatment regimes, sometimes within a single illness episode. The clinician suggested that lay health providers misled patients about their symptoms, which delayed effective treatment. But as Marsland (2017) argues, biomedical practitioners who criticise lay healing techniques, like Naiti’s clinician, may fail to see how their own practices are situated within the local cultural framework. They contribute to shaping and are shaped by patients’ awareness

¹²⁵ Interview, Naiti, 14 July 2017.

¹²⁶ Interview with male patient, 6 June 2017. He believed that he had pneumonia and bought antibiotics to treat it.

and perceptions of inadequate official provision for, and support of, health facilities.

Among Naiti's residents, although febrile illness is more common in the wet season, when the water pools in rocks and other spaces close to *olmareis*, and bushes grow thick outside homesteads and herds graze close to homes, none of the participants linked local illness categories of "malaria" to mosquito bites. Self-treatment of severe illnesses, including those perceived to be malaria, was widespread, often using a mixture of traditional and modern pharmaceuticals, as has been found to be the case in other sub-Saharan African settings (see Jephcott, 2013; Beiersmann et al., 2007). Kunda et al.'s (2007) study of febrile patients with brucellosis in northern Tanzania found that patients delayed going to hospital, with a median delay of 90 days and with 20 per cent of cases presenting to hospitals more than a year after the onset of symptoms. As shown above, the reasons for this are complex, relating partly to how illness is classified, partly to financial and infrastructural resources, and partly to social and cultural processes of diagnoses.

It can be deduced, from the interpretation and classification of febrile illness in Naiti, that seeking treatment for "severe" febrile cases manifesting as *homa kali* are more common among younger males (see Table 5.1). In Chapter Five, I showed the demographic characteristics of patients who presented at the health facility in Naiti suffering from *homa kali*. Over half were under the age of fifteen and were predominantly male. The main reason for these demographics, as I mentioned before, is that families are keen to take these young boys to the clinic because of their role in herding and wanting them to recover quickly so that they can continue their herding chores. Another possible reason for their presentation at formal health facilities could be school attendance, as these boys sometimes attend school (and herd outside schooling hours), where they may learn about their health and access to health services (see also Kunda et al., 2007).

These boys are also more exposed to livestock and thick bushes, where they graze the stock (explained in Chapter Four). As the boys herd full-time, they are constantly interacting with animals. They also consume uncooked milk direct from the cows (and goats) during grazing hours. It is therefore possible that they come into frequent contact with sick animals, resulting in infections that cause "severe fever" and which prompt them to seek medical help (see Crump et al., 2013).

Lastly, *homa mpya*, "new/unusual fever", is the syndrome about which little was known in the study area. This illness did not exist in the historical body of illness experiences

and the assumption therefore was that *homa mpya* was not “indigenous” to Naiti, whereas the other two categories of illness (“ordinary” and “severe”) were. This perhaps explains why many patients who spoke about *homa mpya* sought treatment through formal health services. Despite this clear interest in seeking health treatment, when fever was deemed either serious enough or novel enough to require expert intervention, health-seeking was non-linear and complex, involving an interplay of social, infrastructural, economic and power dynamics. This complexity is important to bring out as it furthers understanding of why a focus on technical solutions for health problems may be insufficient to reduce the burden of zoonotic disease in agro-pastoralist societies.

6.7 Conclusion

Zoonotic control measures emphasise changing lay habits, such as careful preparation of food for consumption and limited interaction with impaired animals, as ways to reduce transmission of diseases, without considering the complexities and negotiating processes involved in health-seeking. As this chapter shows, biomedical approaches would have limited impact in places like Naiti where illness is experienced collectively and socially. People’s health beliefs influence how symptoms are perceived based on the physical (symptom categories), personal (patient profile), historical (experience of previous illness) and social (socio-cultural) contexts within which illness occurs. Some people may choose to live with rather than seek to ameliorate symptoms if they or others in their social network believe that the symptoms do not constitute a serious health problem warranting medical attention. But where symptoms are believed to be serious and a cause for concern, response and actions are influenced by the immediate material conditions that the patient and his or her family find themselves in. Lay referral networks may put pressure on a patient to seek remedies (based on perception and interpretation of the illness) and help with mobilising resources for the patient, to seek professional treatment, or even share past illness experiences upon which treatment can be based. Decisions to approach family and friends or engage in self-treatment or visit a clinic are influenced by inter- and intra-household relationships and interests. Whether people treat themselves or consult family, friends or medical services is complicated further by other factors such as support for health-seeking, ability to secure financial resources, and access to, availability of and quality of healthcare.

Ultimately, people’s decisions to engage with a given medical channel are influenced by

many factors, including the type of illness and perceptions about its severity, who it affects within the household, access to what therapies and for whom, and the perceived quality of the service, as well as financial and infrastructural constraints and familial or household dynamics.

In Naiti, in some instances, residents may choose traditional healers and untrained village allopathic “*doktas*” above formally trained practitioners or government health facilities. In other cases, and upon consultation with lay referral groups comprising family and kin, they may decide that a particularly severe or new type of illness warrants professional and costly treatment. In all instances, gender and household power dynamics, social relationships, and the availability of income cause delays in and complicate decisions about healthcare options. Neither route necessarily offers a clear-cut trajectory back to health or a dependable means of dealing with zoonotic disease.

In conclusion, zoonotic disease interventions centring on the individual rather than the collective are unlikely to work (Strang and Mixer, 2015; Biehl and Petryna, 2013; Good, 1994). It is crucial to explore and understand how household and intra-household relationships impact care-seeking and health outcomes in places like Naiti. As illness is collectively experienced, treatment is defined by these processes. Appreciating these factors can lead to improvements in the design of health interventions, which could result in greater uptake by targeted populations.

7. Chapter Seven: Conclusion – Milk, Meat and Medicine

7.0 Introduction

This thesis has explored the following three research questions:

1. How do men and women in Naiti perceive risk in relation to consuming animal food and interacting with animals?
2. How do local people in Naiti explain and experience febrile illness?
3. How do people decide what to do in cases of febrile illness and what methods of treatment are available?

These questions are central to the lives and livelihoods of the people of Naiti. As shown in the preceding chapters, which address each of these research questions individually, milk, meat, blood, dung and medicine are complex, mutable, related products that are based on a range of different factors, experiences and beliefs about health and disease, and intricately interwoven with access to livelihoods. Human-animal interaction in extensive livestock systems (pastoralist and agro-pastoralist) has been shown to defy simple categorisation (Galaty, 2014; Kohn, 2013; McCabe, 2010). Zoonotic diseases and the ways in which they are transmitted add to this complexity in as far as determining a “host agent” of a given pathogen, the animal or its product, or the exact cause of febrile illness among livestock-keepers, is far from straightforward (Kosoy and Kosoy, 2018).

As an anthropologist attempting to understand lay approaches to risks and to zoonoses, the complexity can become overwhelming. There is however a common theme that runs through the complexities and analysis presented in this thesis which helps me answer these research questions, and this regards the ways in which residents in Naiti relate to milk, meat and medicine. There are a number of similarities between these three substances which matter to an understanding of these three questions.

As I have discussed throughout this thesis, dominant framings of zoonotic risks as “avoidable” so long as local people facing such risks follow certain prescribed practices and take precautions, can be misleading. As Kosoy and Kosoy (2018: 10) observe, expert narratives about the simple causes of zoonoses are inaccurate because “in reality, observed manifestations [of illness] can result from many factors and require the understanding of the entire zoonotic system”. Example of such narratives can be seen in

the assumption that humans and animals are separate entities, and in the notion that so-called risky “contact zones”, referred to by Woldenhanna and Zimicki (2017), can be controlled and or minimised by those who wish to remain “safe” from animal disease. This position is easily challenged by better understanding of communities’ experiences, such as I have described above for the people of Naiti, where animals are not only their products, turned to for food and for medicine, but are also integral for social and cultural cohesion.

Whilst animals, particularly those found in developing parts of the world such as much of Africa and South East Asia, may, in current global public health narratives, conjure up images of pandemics such as the 2009–2010 H1N1 influenza virus across Asia (see Keck and Lynteris, 2018; WHO, 2009; Foster, 2012), in Naiti, as is the case across the majority of herder communities in these regions, animal products such as meat, milk, blood and dung – the very culprits in terms of causing zoonoses – are also powerful substances which people in Naiti cannot live without. The interconnectedness and “oneness” with which people, animals and the environment coexist render simple dichotomies and categorisations of risk, which do not give due consideration to local people’s knowledge of their livestock and their risk-coping mechanisms, utterly problematic. Granted, the risks of zoonoses are real and can be severe; if people consume contaminated animal products, they may get ill and even die (Kosoy and Kosoy, 2017). But equally real are their economic, social and cultural lived realities which may mirror, but at times also diverge from, broader socio-cultural discourses in Tanzania about food, medicine and health (Galaty 2014; Caudell et al., 2017; Ladbury et al., 2017). Besides, zoonoses are one among a myriad of everyday risks that define the precarious existence of livestock-herders, which many families, including those in Naiti, must cope with and make decisions about via a range of trade-offs (Cleaveland et al., 2017; Ladbury et al., 2017). It is therefore problematic to assume that if people change their behaviours and practices around livestock and livestock products, and boil milk and meat thoroughly before ingesting it (for instance), they will be relatively safe from some zoonotic infections such as brucellosis (see prescription of “safe” practices in CDC, 2019; Shirima and Kunda, 2016; Bashaka, 2015).

Indeed, as I illustrated in chapters Three and Four, even the concept of “boiling” itself is open to misinterpretation because of the way it is applied in some cultures, including among the WaArusha in Naiti. Here, “boiled” milk often means milk that is obtained

fresh from the cow (or goats), and not necessarily boiled via heating, as is implied in expert prescriptions such as in the CDC directives on preventing brucellosis transmission. In Naiti, local people make a distinction between “boiling”, which means warm and/or fresh from the animal (whether milk, meat or blood), versus “cooking”, which involves heating in a pot on a fire or placing over an open fire. Thus, herein lies the challenge of prescribing “ideal” behaviour and practices without considering contexts in which such concepts might be interpreted differently (see for example Schneider, 2017; Good, 1994; Goodwin et al., 2012; and Geertz, 1973, on context-specific interpretations).

Consequently, expert framings of risk and prescriptions for risk management can only work when constructed alongside, and in conjunction with, lay beliefs and approaches. Not doing so results in parallel worlds where lay people are blamed by experts for “causing” their own sickness, while at the same time expert authority continues to be distrusted by local people, resulting in ineffective interventions.

Therefore, in this final chapter, I highlight the ambiguity and ambivalence that characterises the relationship that herders in Naiti have with milk, meat and medicine, in order to bring out the complexities that challenge simple narratives about zoonotic disease causality in these settings. I emphasise the role of these products in local livelihoods, at the same time as they are at the epicentre of global public health debates on food safety, health and appropriate use of medicine. I start by briefly restating that fundamental to my empirical analyses in this thesis is the understanding that studies on zoonotic disease risks must go beyond establishing causative agents, which are often prioritised by biomedical science, by drawing on multidimensional and multidirectional approaches that bring out the complexities of human-animal interaction. This should involve an ontological turn to consider more seriously local people’s knowledge about their livestock and the risks they pose to human health, because as Keck and Lynteris (2018: 6) rightly observe, such knowledge opens “the spectrum of agencies and causalities in the entanglement of humans, animals, and pathogens”. This spectrum, for WaArusha agro-pastoralists, can be understood by exploring the similarities between milk, meat and medicine.

7.1 Milk, Meat and Medicine as Ambiguous Substances

Zoonotic pathogens which have been found to cause human diseases such as brucellosis, anthrax and RVF, and which are common among livestock-keepers in Tanzania, are largely associated with the consumption of unsafe animal products consisting of milk,

meat and blood, and/or contact with animal fluids such as contaminated birthing material (Shirima and Kunda, 2016; Halliday et al., 2015). Yet in many WaArusha households, as is the case all over the world, these products are good and life sustaining, keeping people alive and healthy (see for example FAO, 2008; ILRI, 2012). When something goes wrong and infection occurs, experts are quick to associate zoonoses in these settings with “irresponsible” consumption habits, of meat, milk and medicine by local people. Thus, the ambiguity of representation in human-animal interaction is seldom brought out; it is seldom recognised that the idea that milk, meat and medicine make people sick conflicts with the fact that these products provide nourishment and sustain good health in people. There is even less recognition of the fact that these dominant perspectives about what is safe and what is not can also reflect what lay people themselves think about their health in relation to that of their livestock.

For instance, as I demonstrated through local narratives about risk in Chapter Four, WaArusha agro-pastoralists are aware of some of the risks associated with the consumption of livestock products such as milk and meat. Families abstain from consuming internal offal in animals suspected of having died from anthrax, which they believe can be determined visually as elders can “see it with naked eyes”. Yet at the same time, many families slaughtered sick livestock, especially small stock, for food, particularly during the dry season when food scarcity was rife. This was also partly because of a commonly held belief that “invisible” illness in animals was less of a risk to people than when illness exhibited “visible” signs such as in the case of anthrax (inflamed or discoloured offal), and also that sickness in small ruminants did not affect humans. In addition, animal products, as I referred to earlier, are used as medicine for treating a wide range of illness, include febrile illness. Therefore, although animal products sustain human health, people are aware that in certain instances these things can also make them sick in different ways, and it is hard to “see” when or how they might make one sick.

Consequently, whether Naiti residents will observe withdrawal from sick livestock products or not depends largely on the “visibility” of a “disease” in the said animal or its products, and on the ways in which they frame the relevant products (meat, milk or medicine). Yet many zoonoses are not easily visible, not even to an expert eye, as Kosoy and Kosoy (2018) make clear, and certainly not many of those zoonoses that afflict the people in northern Tanzania such as brucellosis, Rift Valley fever, Q-fever and

leptospirosis, among others (Halliday et al., 2015; Crump et al., 2013; Shirima and Kunda, 2016).

7.2 Milk, Meat and Medicine as Controlled Substances

For over 900 million poor livestock-keepers globally, mostly in Tanzania, Ethiopia, Kenya, Burkina Faso, Nepal, India and Bangladesh, livestock products (especially milk) are a crucial source of life-sustaining proteins (Grace et al., 2017; ILRI, 2012). These countries also represent populations with limited access to medical resources and, as I have shown in the Tanzanian agro-pastoralist context, medicine is often obtained from unlicensed sellers, without adequate labelling, and is shared between families as well as between human and animal patients.

For many people in Naiti, access to these vital products is controlled by cultural and social norms that dictate who can access what, and under what circumstances. For instance, I showed that men and women and boys and girls have differential access to milk, meat and medicine; men decide on meat distribution when an animal is slaughtered, while women may decide on how to distribute milk across the household. Boys and elderly men are often prioritised in cases where the substance is insufficient for the whole family. The same goes for medicine, where social relations condition access to it, and as I demonstrated in the preceding chapter, these relationships are complex and can limit a patient's choice of medical providers even when factors such as affordability and access are favourable. Therefore, health-seeking behaviour studies in cultures such as the WaArusha ought to consider how social relations affect access to life-sustaining products (milk, meat and medicine) beyond the conventional barriers to health-seeking, such as infrastructure, income and the quality of healthcare, which are all important, but are not the only considerations for people living in places like Naiti and elsewhere.

7.3 Milk, Meat and Medicine as Mediators in Social Relationships

Milk, meat and medicine also play a powerful role in mediating and enhancing social relationships and cultural cohesion. Medicine is shared between families, and milk and meat are essential components in local rituals. However, for a person in Naiti, access to milk, meat and medicine is conditioned by both what one needs to stay healthy and by one's position in the social structure. As I mentioned above, in WaArusha society, men and women (across all ages) have different access to these products. Access to medicine

is also conditional on how one's symptoms are interpreted and by whom, as well as the patient's individual characteristics, including his or her relationship with other kin, neighbours and friends.

In Chapter Four, I discussed the ritual significance of various animal species and the significance of milk to women, pointing out that often this is the only part of an animal that they can truly claim ownership of. Men often own and control the family livestock, but in some cases a man may offer small ruminants such as sheep and goats to be slaughtered for his wife or wives (or daughters) to consume in certain periods of their lives. For example, sheep meat is traditionally served to women immediately after giving birth, and sheep fat is mixed with herbal medicine and applied on bodies (of both mother and baby) as a protection against evil, including illness. In addition, as a celebration of the birth of a boy, his father may give him a heifer from which the boy may grow his own herd when he comes of age. At the same time, bulls are associated with male eldership in the way, for example, a bull is killed and eaten by mourners during an elderly man's funeral, and its blood poured on the ground to signify a connection between the living and the ancestral world, into which the departed elder is believed to ascend.

Consequently, milk, as well as meat and medicine, can be seen as products positioned between different social "worlds", and they each play a role in mediating between these worlds. Milk is a product which mediates relationships between husbands and wives (or married men and married women), and sons and daughters, as in the way in which men own the cattle, and women own the milk and produce it for men; daughters are married off in exchange for milk cows and in order for sons to acquire wives, their fathers have to part with milk cows. In a similar vein, meat mediates between fertility and healthy futures, in the way sheep meat and fat is used as food and medicine for nursing mothers and to protect them and their new born babies against ill health. Meat also mediates between ancestors and lineages, given its use in rituals, in marriage and in the ways young men acquire cattle from their fathers to start their own herds. Medicine mediates between the indigenous pastoral/agro-pastoral way of life and other ways of life (the city, modernisation, youth and "progress"), as demonstrated by the ways in which young and older people seek healthcare in Naiti. Younger people, particularly men, prioritise hospital medicines, whilst older generations place greater value on indigenous therapies.

In mediating between these social worlds, milk, meat and medicine also become extensions of these social relations. In other words, in order to get access to milk, one needs women, i.e. wives and daughters; to get access to meat, one needs men, as they own and control the livestock; and finally, in order to get access to medicine, one needs to have good relationships with neighbours, senior elders and in-laws who are deemed to be more knowledgeable in labelling illness.

Therefore, in answering my research questions – how do people in Naiti perceive risk, explain and experience febrile disease, and seek treatment for febrile disease? – it is vital to recognise the following:

Firstly, that inter- and intra-household dynamics must be considered, alongside recognition that illness is socially experienced, and treatment stretches beyond individual patients or a single illness episode. This includes noting the gender- and age-based division of labour that conditions everyday human interaction with livestock and results in differential exposure to animals, both sick and healthy. These aspects of human-animal interaction affect health-seeking behaviour, as household bargaining power determines how resources are allocated, including for healthcare. Therefore, understanding these dynamics is necessary in order to design targeted interventions for individuals and groups most at risk of disease transmission.

Secondly, that categorisation of fever and corresponding labels (“ordinary fever”, “severe fever” and “new fever”) must be understood and should form part of the terminology used in interventions aimed at controlling zoonotic causes of febrile illness. Often, lay illness categories do not fit Western classification of diseases. Yet the power of labelling is explicit in the way people talk about symptoms, as these labels determine how patients engage with local health systems. For example, where illness is labelled “severe”, younger men and women are more likely to seek biomedical treatment, while older men may delay treatment but seek help promptly when the illness is labelled “new” or “unusual” fever.

Thirdly, that labelling matters. Emic categorisations of ill health demonstrate instances where biomedical labels like “zoonoses” are unhelpful in addressing people’s health problems as they do not correspond to any known local illness category, and this may in itself limit health-seeking actions. This is crucial, because the way clinicians label fever as malaria (as is commonly the case in many Tanzanian health centres) may result in

people delaying treatment, since early symptoms of malaria, as it is locally conceptualised, easily fall into lay labels of “ordinary fever” (see Table 5.2). Indeed, emic labelling of fever may mean that symptoms often associated with brucellosis such as mild headache and tiredness, which in Naiti’s local taxonomy would constitute “ordinary fever”, may not be that “ordinary” after all, but which may result in delays in health-seeking. Equally important is the emic labelling of different animal and human diseases with the same name, or of the same disease with different names, which may present challenges when prescribing treatment. For example, and as I demonstrated in chapters Five and Six, *oloirobi*, which corresponds to colds and flu in humans, but is also the local term for perceived *foot-and-mouth* disease in animals, may lead to lay people not being able to recognise risks relating to the disease in people, and therefore not taking precautions. Another example is where different names refer to the same disease, which may mislead people into sharing medication inappropriately across humans and animals, and not interpreting biomedical instructions as expected.

In addition, and as I mentioned earlier, labels go beyond illness to also include how people interpret and apply terminologies such as “boiling” and “cooking”, which if not clarified can lead to conflicting ideas about the conditions in which animal products can be deemed “safe” for human consumption and when they are not. For example, if the term boiling is used as a precaution in public health messages, families in Naiti may perceive consumption of milk fresh from the cow as a safe practice, when what is implied is about “cooking” the milk and or meat. It is therefore important to explore lay labels for health problems or risks as well as everyday food preparation and consumption habits and incorporate these into public health messages that aim to improve early treatment-seeking for febrile illness in these communities. Not doing so results in a mismatch between lay people’s strategies embedded in social networks and value systems, and biomedical approaches developed based on expert authority.

7.4 Theoretical Contributions to Knowledge on Zoonoses and Fever in Northern Tanzania

This thesis has examined lay interpretations of fever, ill health and zoonoses in the context of human and animal health challenges and weak health systems, using the lens of ethnography that is rooted in a first-hand extended fieldwork study of a remote agro-pastoralist village in northern Tanzania. This study offers a different set of explanations

from those offered by purely biomedical narratives for drivers of zoonotic diseases. It highlights the complex lived realities that characterise WaArusha peoples precarious lives, and the myriads of risks that these produce, viewed from a broader risk landscape that goes beyond zoonoses and pathogens.

This research moves past technical discussions of the risk factors associated with zoonotic disease and highlights how structural inequalities lead to vulnerabilities that result in marginalisation and poverty, and which arguably, can contribute to a lack of wellbeing and the spread of zoonoses. In specific terms, I highlight how health systems in northern Tanzania are deeply compromised by a lack of state investment, including poor regulation, critically under-equipped and under-resourced health facilities lacking vital medicines, diagnostics, and human resources to name but a few. Consequently, for places like Naiti, informal health actors have filled this gap and provide the majority of health services to local families. These informal healers are often more trusted than official health facilities as they show compassion and blend holistic approaches to health with aspects of biomedicine and traditional healing practices. This is however more complex and nuanced than it might at first appear. Trust is also influenced by how people interpret their physical symptoms and with which zoonoses these symptoms are connected. In some instances, where people believe they are suffering from severe fever and particular forms of zoonoses, such as *brusela*, they are more likely to trust government health facilities.

This thesis has drawn from several existing bodies of theoretical literature including; Sociology of Risk, Health Systems and Health-Seeking Behaviour. In adhering to the principles of an anthropological study, the thesis employed an ethnographic methodology centred on participant observation and emic perspectives.

It is my view that this thesis contributes original knowledge in the following four ways:

First, connecting zoonoses to fever or febrile illness and to livelihoods offers novel insights both into the study of zoonoses and in terms of understanding health in rural communities and provides new ways to examine these issues. There are however real epistemological challenges in adopting such an approach (referred to earlier in Chapter Three). In particular, zoonoses and illness are intangible and amorphous categories and require biomedical investigation before one can be sure that people's emic interpretations – or even skilled medical practitioners' diagnoses – are accurate. Therefore using

ethnographic interpretations as a basis for constructing evidence for zoonoses remains a challenge. However without these emic perspectives, one has little sense of the ways in which technical, medical definitions of disease connect with local people's understandings and experiences. Biomedical technical solutions can only go so far in having a real impact in the complicated, pluralist health landscapes that I have described in Naiti. Finding ways to bring these dimensions closer together is an imperative if we are to tackle zoonotic disease emergence and re-emergence. This thesis takes a first step in this direction.

Second, there are very few studies that attempt to quantify time and exposure to livestock using gender and gender-based allocation of labour as a way of thinking about susceptibility to zoonoses among livestock-keeping communities. By using this approach, I have challenged the assumption that men and boys overwhelmingly look after animals in pastoralist livestock systems across Africa, showing both that women regularly look after sick animals, small stock and cows producing milk for the household. Young boys also spend significant periods of time herding livestock and, on occasion, sick animals. Thus, in terms of health and spillover from animals to humans, it could be the women and pubescent boys that are more exposed to sick livestock and therefore more could be susceptible to zoonoses.

Third, I have highlighted the unique socio-cultural, environmental and economic positioning of the WaArusha ethnic group, who have traditionally been absent from policy in Tanzania, and also completely overlooked in the literature on pastoralism in East Africa. As a category of people, WaArusha straddle the divide between settled and pastoralist livelihoods systems, and as such, perhaps they are a model for what the state wants as is evidenced by state policies in Tanzania towards sedentarisation (McCabe et al., 2010), or perhaps they are not, as recent land-use policy changes in Tanzania seem to disfavour any forms of pastoralism altogether (Msoffe et al., 2011). Yet, the literature on pastoralism in northern Tanzania tend to focus on the Maasai and makes little mention of WaArusha agro-pastoralists (see for example, Caudell et al., 2017; Queenan et al., 2017; McCabe et al., 2010; Smith, 2012 to name but a few). I believe, however, that researchers ought not overlook the nuances that place WaArusha in a unique positionality that requires specific policy attention, and this thesis is an attempt to highlight and contribute to filling this gap.

Finally, I challenge the way veterinarians and medics attempt to map zoonotic disease categories directly to local illness labels (the case of *ormilo* or malignant catarrhal fever described earlier) by authors such as Queenan et al. (2017), Caudell et al. (2017), Lankerster et al. (2015a; 2015b; 2016). Instead I show that emic categorisation emphasises other aspects of fever and zoonoses to those highlighted in medical diagnoses. For example, *ormilo* is perceived locally as a “headache” illness in small ruminant that is caused by a lack of pasture and water, making goats “weak and dizzy”. Moreover, this illness is not usually associated with human illness and in fact, sick goats (with suspected *ormilo*) are prioritised for slaughter for family consumption. At the same time, there are varying understandings of this syndrome and its aetiology among biomedical scientists as I explained in Chapter Four. Therefore, such correlations are misleading and unhelpful because emic labels draw from historical illness taxonomies embedded in cultural systems that do not simply translate directly into biomedically-defined disease categories. What would be more helpful would be to expand on this emic ethno-veterinary knowledge using multiple research approaches that straddle disciplinary boundaries, in order to understand the contexts and meanings of lay labels and how they are positioned in relation to animal and human disease.

7.5 Towards A Holistic Approach to Zoonoses in Low-Resource Settings

This thesis challenges the priority given to technical solutions based on scientific and funder-driven rationales in global response mechanisms to public health threats. These mechanisms are driven by dominant framings of risk which cast people’s cultural practices and everyday events as “risky behaviours” which are all too readily blamed for enabling the transmission of pathogens from livestock to people. Yet as this thesis shows, a complex interplay of social, cultural, environmental, economic, biomedical and political factors interact with biological processes, giving rise to differentiated vulnerabilities and susceptibility to infections. It is not all about risky events of transmission, which can be avoided or prevented; rather it is about everyday life, which produces a wide range of risks – some of which are related to health and others of which link to food production, social relationships, travel, political constraints etc. – that people must constantly manage, often with few resources.

This thesis challenges stigmatising discourses about cultural practices as the case of zoonotic transmission in lay populations as these are unhelpful simplifications in a very complex picture of risks associated with broader livelihood challenges. As I show throughout this thesis, there is nothing mystical about local customs, practices and behaviours that can drive zoonotic infections and cause febrile illness. These are ordinary people trying to do what they can in the midst of overwhelming life risks with almost nothing, in terms of resources, at their disposal.

The main findings of this thesis can be summarised in three broad ways. Firstly, that zoonoses are complex and involve interaction between people, the environment and institutions in ways that defy simple categorisations of illness, disease, drivers, and quantification of risks. Norms of interaction are constantly nuanced at every level, they are not static, and they influence exposure to livestock, including sick animals. They also influence health-seeking behaviours as well as ideas about food safety, and therefore, there is a need for contextualised research to bring out these nuances to guide effective interventions for zoonotic disease.

Secondly, the sense of animals and humans as sharing a lifeworld is deeply embedded and is reflected in narratives of despair as the examples in Chapter Four illustrate. Also as Keck and Lynteris (2018) and Kosoy and Kosoy (2018) have rightly observed, zoonoses contagion is not straightforward and is difficult to pin down to a single cause. For example, in Naiti, and as I explain above, livestock products themselves straddle the divide between wellness and health and so they are symbols of tension between public health efforts and contextualised local experiences. They are both food (e.g milk, meat, blood) and medicine (animals used in healing rituals, and milk and meat as key ingredients in commonly used traditional medicine), and they have come to symbolise both access to life-sustaining resources and the limitations of this access for people who live precarious lives.

Thirdly, conventional barriers to health-seeking such as cost, access and perceived quality of care need revisiting and interrogating further. As I have illustrated in Chapter Six, treatment-seeking for patients in Naiti is influenced by complex inter and intra-household power dynamics and social relationships that go beyond the individual patient or patients, or indeed their respective households. Decisions on where and when to seek treatment for a given illness are arrived at through a web of consultations, based on historical and

experiential knowledge that is deeply preserved in certain family and community members, who have the greatest influence on patients' medical activity and on a wide range of social relationships which position the candidate in relation to household, family, and lineage. Understanding these social dynamics is crucial in interventions that seek to improve healthcare-seeking practices and impact early detection of zoonoses in these communities.

These complex sets of arrangements render zoonoses and understanding trajectories of febrile illness particularly in agro-pastoralist settings far from simple, partly because of this sense of deep embeddedness of animal and human life worlds in which the lines between the health of people and their livestock is ever so blurred and partly because of the nuanced, contextual factors which shape the interpretation of illness and fever. What is needed therefore, are intersectional approaches to understanding ways in which people are positioned in relation to livestock, to zoonoses and to fever and their health-seeking behaviours.

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